REALISM IN EXERCISES

THESIS

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AFIT/GLM/LSM/89S-26

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Preface

The purpose of this research was to analyze the current method for conducting command post exercises and to discover potential methods for increasing realism in them. As part of the study, a simulation model was developed for use during command post exercises with the hope that this model would provide some additional realism to our exercises and thereby provide for a better prepared force.

I am indebted to several individuals and some organizations. I would like to thank my family first and foremost for the sacrifices they endured while I conducted research. I would like to thank Capt Russ Hall for his help in the initial stages of this project and for our lengthy discussions about realism in exercises. Lt Col John Halliday, my advisor, deserves thanks for his review and for giving me freedom to pursue the topic in my way. Lt Cols Holt and Peschke and Mr. Phil Cobbin also deserve acknowledgement for their help with the simulation model.

I would also like to express my appreciation to Lt Col Lutz, AF/LEXX, for sponsoring the research; AFLC/XOWE and Mr. Llewellyn for their help and funding; the 178th TFG (Ohio ANG) for their inputs to the initial model; and AFLC/MMIR for supplying the WRSK information. Additionally, I would like to thank the 33 individuals who gave of their time during the interviews and provided so many wonderful comments.

Stephen J. Hagel

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Abstract

The purpose of this study was to examine the process of command post exercises and logistics realism associated with them. The research had several objectives: identifying problems in obtaining realism in exercises; posing possible solutions to the problems; and investigating the feasibility of using a computer simulation model to add to logistics realism for response cell play during a command post exercise.

The study identified many perceived problems with the exercise process. Among those problems were: time, time for conducting the exercise, planning the exercise, and participating in the exercise; people, getting the correct participants playing at the proper level and having the best people plan and play the exercise and maintaining the proper attitude toward the exercise; money, a scarce asset which is becoming even more scarce; and feedback, there is not enough of it for the players or the decision makers.

These findings surfaced through the literature, personal observations during Wintex 89, and interviews of 33 personnel who were familiar with command post exercises. The results of those interviews revealed that there is not enough logistics realism in the exercise program, but there is some worthwhile training coming from them.

REALISM IN EXERCISES

I. Introduction

General Issue

In a recent article published in Armed Forces Journal International, an author, identified by the pseudonym of Lt Cmdr John Melos, USN, stressed the importance of realism in exercises:

> My contention is that the failure to deploy mine warfare units to the Persian Gulf was a result of the way the US Navy conducts its training exercises, both on the sea and on paper. As a result, real world planning (based upon experience gained in such exercises) may also ignore threats, potential losses, and shortfalls in capability. (21:76)

Melos is emphasizing the importance of practicing for war as it is intended to be fought. If threats and shortfalls are continually ignored in exercises, those exercise simulations may come back to haunt us in real world situations. This practice extends to all training exercises, both actual deployments and movement of forces as well as the paper exercises where procedures and plans are tested. By ignoring realism, there is an inherent risk of improperly preparing for war.

Melos is not the only one to stress the concept of preparing for war as it will be fought. General Welch, the Chief of Staff of the United States Air Force has emphasized

this as well. He stated "the key to unlocking the combat capability inherent in quality people and equipment is training the way we will fight." He adds that the joint exercises are the method to acquire some level of combat experience in peacetime (32:116). Clausewitz has addressed the issue too. In his chapter on friction in war, he discusses the importance of preparation through peacetime exercises (2:168).

This research examines the topic of realism in exercises and analyzes the process of military exercises. It addresses realism in exercises, particularly logistics realism, and attempts to answer the questions of whether the U.S. Air Force portion of the Department of Defense (DoD) exercise program provides the necessary logistics realism, and if not, how can that program be improved. The study evaluates the current method for planning exercises and whether or not that procedure needs improvement. Additionally, it examines factors which contribute to realism in exercises.

Background and Problem

Exercises have played an important role in military operations from early times to the present. Sun Tzu, the Chinese philosopher wrote about them (27:2). Josepheus, the famous historian is quoted saying "The Romans are sure of victory ... for their exercises are battles without bloodshed, and their battles are bloody exercises" (14:328). The Germans at the Battle of the Bulge prepared through exercises

prior to that great battle. The Japanese, prior to the attack on Pearl Harbor and Midway also used wargames to determine the impact of their attack (9:12; 16:24; 27:2). Leading up to the assault on Normandy, the allies "modelled" the operation to ensure success (28:206-207). These exercises or war games met with varying degrees of success, depending upon how well the game was developed and how well the battle was fought. Forsaking realism in order to manipulate the outcome could lead to defeat in the field (9:39; 16:24; 27:11).

In spite of the writings about exercises and wargames throughout history and the stress given to the importance of being realistic and not over simulating, the problem of unrealistic exercises still plagues the Department of Defense. Among the reasons for this problem is that exercises are too large, too restrictive, and the planning too disjointed (13:1).

Responding to a message regarding exercise realism from the Joint Chiefs of Staff, JCS-J4, Headquarters USAF/LEXX (the logistics exercise planners for the Air Force) stated that logistics realism in exercises has required attention for a long time, yet the task was often considered either too large to do or too restrictive. As a result, any attempt to fix the problem has fallen short of the mark. When LEXX speaks about the task being too large, they refer to the massive scope of the logistics disciplines--maintenance,

transportation, supply, et cetera, and the difficulty of solving the problem within the exercise planning cycle (usually two years) (13:1).

In the case of restrictiveness, LEXX means the objectives of the exercise could not be achieved due to constraints in the logistics system and the duration of the exercise. An aircraft can launch in a matter of minutes, but in order to get that airframe to a launchable configuration, requires hours or even days. There is just not enough time in most exercises to play to that level of realism and still meet the objectives of the exercise.

Although an exercise may be well-planned from an operations perspective, the attention given to the logistics considerations is often overlooked (22:21). Even with the continued attention given to ensuring that operations, planning, and logistics staffs get together to adequately plan both exercises and wars (not to mention the Services getting together on issues), the Department of Defense still experiences problems with disjointed planning (1:23; 15:28). Operation and logistics planning are parts of the same whole; assumptions made on one side are important to the other side as well. When developing a course of action, planners must consider both operational and logistical feasibility (8:17). This applies in the development of exercise plans as well as real world plans. Only a foolish individual would plan an operation based simply on the number of airframes, without

taking into consideration the munitions, fuel, maintenance, and spares it would take to make those airframes mission ready in the first place. Should the Air Force do anything less in its exercises? The USAF can not have operations without logistics and without operations, there is little need for logistics.

This study concentrates on the CPX. The purpose of the CPX is to exercise plans, procedures, personnel, and communications systems. Due to the limited time available in a CPX, decision makers are bombarded with a wide variety of inputs from fuel shortages and lack of airframes to virus infested blood plasma and terrorist attacks on installations. These events are channelled into a two-week period or less, but realistically, they could take months to discover and solve. To avoid actual stoppage of the exercise, time is compressed and events are simulated as being accomplished. There is a trade-off between achieving the goals of the exercise and logistics realism. In order to fulfill the objectives of the exercise and train the participants, the CPX has numerous artificialities. The concern here is that these artificialities do not provide a realistic picture to either the players or decision makers during the exercise (13:2-3). On the one hand, the picture could be rosy, giving the decision maker a false sense of security that certain assets are available for tasking when in "reality" they are not available due to lack of parts, fuel, or some other

logistics concern. The reverse is also true.

The picture is not all one-sided. General Vessey, former Chairman of the Joint Chiefs of Staff, commenting about the exercise program said that none of our exercises stressed the force to the degree that a war would stress it, but our job is to take all we can from each exercise and apply that to the real world (29:60). Many things can be learned from a well-played exercise and they do have applications to the preparation for war, but is there a better way to provide logistics realism?

Problem Statement

This study examines the current method for planning and executing exercises and whether that process needs improvement. It asks the question of what factors contribute to realism in exercises. It investigates whether or not alternative means could be used to provide more realism to CPXs which would more accurately depict the real world and therefore provide that additional realism.

Research Questions

Specific questions to research include the following:

1. What is the purpose of the Joint Exercise Program?

2. How is the planning accomplished for command post exercises?

3. How are logistics inputs to the exercise made?

4. What are the exercise objectives and are they achieved? If not, why?

5. What are some tools which may be adaptable to address the problems?

6. Can a computer generated logistics simulation model, based on peacetime aircraft data, add additional realism to an exercise?

7. If this simulation model is viable, can it be used during an exercise? If so, how?

8. Will this model better portray logistics realism?

9. What are the limitations of the model and are there impediments to its implementation?

Scope

The overall approach is to learn as much as possible about the exercise process; examine the procedures for developing command post exercises and determine if improvements can be made; and evaluate the possibility of using a computer simulation model to provide additional realism to command post exercises. The study focuses on the need for realism in exercises, emphasizing the logistics inputs to the exercise and the reaction to those inputs by decision makers.

The research concentrated primarily on the command post exercise, although it looked also at wargames and field training exercises (FTXs) since some of the principles from them apply to CPXs. The research addressed topics from wargaming, simulation, and exercises, to logistics, strategy,

and tactics. Each one of these topics plays a role in exercise realism.

An additional purpose of this research was to identify some tools, specifically computer applications, which would add realism to the exercise process and to make recommendations regarding their design and use. This study provides a starting point for this topic and the development of systems to improve U.S. Air Force exercises.

Key Terms and Definitions

In order to understand the topic accurately and to avoid confusion caused by different meanings, there are some terms which need defining. Unfamiliar terms will be defined as they appear in the text, but of immediate interest are the terms war games, exercises, model, simulation, response cell, and logistics. Some of these terms are often used interchangeably, although such usage is not technically correct. In the following paragraphs these key terms will be operationally defined in the manner they are used in this research.

Wargames

In his article "War Games, Analyses, and Exercises", Perla defines a wargame as:

> a warfare model or simulation whose sequence of events is interactively affected by decisions made by players representing opposing sides, and whose operation does not involve the activities of actual military forces. (24:44)

Although this paper stresses exercises and especially command post exercises, and will not actively address war games, such as those held at the National Defense University, the Air Force Wargaming Center, or other locations, many of the principles from war games apply to exercises as well as to computer simulations.

Exercises

Perla defines exercises as "any activity involving the operation of actual military forces in a simulated hostile environment" (24:45). There are two main type of exercises: command post exercises (CPX) and field training exercises (FTX). In a command post exercise (CPX), the existence and movement of forces are merely simulated and the war fought by headquarters' staffs and response cells on paper. The entire process is a preplanned, scripted scenario, designed to test plans, procedures, personnel, and communications, as well as training response cell and battle staff members and the higher level decision makers. Perla allows for this "paper war" as the exception to his stated rule on exercises regarding operation of actual forces (24:45).

In field training exercises (FTX), forces, equipment, personnel and aircraft actually move somewhere, either in a deployment role or in an employment role. It is conducted under simulated wartime conditions with actual combat forces. Once again, this study will not actively address FTXs, which are inherently more realistic, however, much of the research

and many of the principles from field training exercises apply to command post exercises.

Models

A model is a representation or an abstraction of a system, object, or a particular real-world phenomenon (3:47). A good model displays the key properties of the entity it represents. By using models, we can investigate certain relationships and the interaction between key variables in the process (4:9-10). In this light, a toy airplane can be a model, but for the purposes of this research, the term model refers to a computer model which is a series of written directions to the computer to execute a program which will simulate to some degree, reality. A model should represent the object but still be simple for analysis of the process (3:47).

Simulations

Simulation has two meanings for purposes of this study. The first meaning relates to models and modeling some process, such as aircraft sortie production.

> A simulation is any system or operation which has a relevant behavioral similarity to the original system or operation. Therefore, a simulation does not have to be an exact reproduction, but must behave in a similar fashion. (27:1)

The simulation can be performed either mathematically or by a computer. Used in this context, simulation and model mean nearly the same thing.

The other meaning for simulation relates to pretending that some event transpired, such as time elapsing, spare parts delivery, or even a battle. During an exercise, there are traditionally many of these types of scripted simulations.

Response Cell

A response cell is a small group of key personnel who represent the battle staff of an Air Force unit. This cell usually has no more than 20 people assigned to it for the duration of the exercise. Response cells are comprised of operations, logistics, personnel, and intelligence staffs. Their job is to respond to messages from higher headquarters and lateral units during exercises. Their activities simulate the activities of their deployed unit.

Logistics

Finally, a definition of logistics is appropriate to the understanding of this thesis. Logistics is the "creation and sustained support of weapons and forces to be tactically employed to attain strategic objectives" (6:20). Air Force Manual 1-10, Combat Support Doctrine, defines it as the "art and science of creating and sustaining combat capability" (5:1-1).

Following Chapters

Chapter II discusses the literature pertinent to the topic. Chapter III explains the methodology used during the

research. Chapter IV discusses observations from the researcher's personal participation in a command post exercise, and responses to interview questions about the exercise program. Chapter V contains a description of the simulation model. Chapter VI provides conclusions, recommendations, and suggested follow-on research.

Appendix A contains the interview questions for the experts in logistics exercises as well as for the participants in those exercises. Appendix B contains a summary of responses to interview questions two through ten. Appendix C is the simulation program. Appendix D is the user guide for the model. Appendix E lists the WRSK used in the simulation.

II. Discussion of the Literature

General

There is a perceived need for more realism, particularly logistics realism, in the Department of Defense exercise program. The exercise program evolved from the need to prepare both decision makers and their staffs for war (15:27; 17:25). The emphasis on planning for the war through exercises is critical. General Vessey said if the armed forces do not prepare for war, then we would not only fail to win the war, but also would not deter war. He added that the time to prepare for war was now, during peacetime, so we could fight the wars in the future (29:57).

There is a need to teach the generals and admirals, as well as their staffs, how to respond to a wartime scenario and develop their wartime skills (15:27). General Vessey said that training was the fiber which held our forces together and provided the force to defend the nation (29:59). General Welch echoed that sentiment (32:116). Exercises are the method to do that. Exercises not only teach reaction, but also awareness, so the players will be better prepared for war (2:168; 17:25; 24:48).

The Purpose--Experience

We have been fortunate in the United States. There has been no U.S. involvement in a war for nearly a generation. The armed forces have not had any actual battle, with a few

exceptions such as Grenada, Libya, and the Persian Gulf skirmishes, since Vietnam. Where does that put them today? Clausewitz commented that actual combat experience was the way to reduce friction in war (2:164; 31:8). As the number of combat experienced personnel diminishes, the Department of Defense must fill that experience void some way. Experience is the best teacher for war, yet most military personnel learn about war only from books (10:4). For instance, of the nearly 105,000 Air Force officers who served in Southeast Asia (not just Viet Nam and counting temporary duty personnel), there are less than 11,000 of those officers currently on active duty. This total includes officers who served in the theater, not just those with active combat experience.

Experience is hard to come by. Operations has ample opportunities to practice their wartime tasks every year. There are numerous exercises designed to realistically test the operations community--Red Flag, Blue Flag, and others. But, as Col Bartlow points out in his article, "The Operator-Logistician Disconnect," the logistician has little chance to practice realistic scenarios. The exercise is a "shortened, simulation-laden, command post exercise." As a result, the logisticians are not prepared to handle an ever-changing, dynamic situation (1:23). The Air Force may have forgotten the lessons of history regarding wartime logistics planning (1:24). There is no on-going war, but as Clausewitz notes,

exercises are another way to "experience war" through training (2:167; 24:48).

The Purpose--Training

In his article on the evaluation of combat support doctrine, Lt Col McDaniel provides some damning words about logistics training. He states:

> Certainly, the purported lack of interest for the logistician can be directly attributed to a peacetime environment that does not foster a warfighting mentality. .... Moreover, realistic logistics training is marginal at best. Most joint and Service exercises begin after deployment and end well before sustainment becomes an operational constraint. The magnitude and complexity of a major force deployment or sustainment have not been rigorously tested in either a field training exercise (FTX) or command post exercise (CPX). The reasons for these deficiencies are understandable but should not be tolerated. In essence, the unannounced FTX, involving a major force, would be cost-prohibitive and the CPX lacks the interactive computer simulations that can replicate realistic logistics phenomena. The real danger of these training inadequacies is that commanders do not fully appreciate the impact of logistics on operations. And, logisticians will be unable to assist the commander because they have not been educated to handle the enormous detail of a major operation at the theater and global level. (20:14)

If JCS exercises are the cornerstone of readiness of the USAF forces and if they are vital for the training of those forces, then the perceived deficiency in realism in exercises poses a threat to the readiness of the force.

Perla looks at both exercises and wargames as training devices, and in fact says the terms are often used interchangeably (24:48; 25:70). The difference lies in the

players and the teaching goals. Small teams play wargames. Such games have two teams playing a mock war. One team is red; the other team is blue (16:20; 17:25). A control team monitors the events, providing inputs to both teams. Often a computer assists with the wargame play (17; 24). Training in wargames is focused on the decision-making process and discovering what those decisions may mean in a war (9:50; 19:4; 24; 25).

Exercises involve large numbers of people responding to events generated either by an exercise control team using pre-planned or "scripted" events, or by real life events (24:48). These scripted events are called the master scenario events listing (MSEL) and contain activities such as base attacks, aircraft attrition, fuels shortages, and a myriad of other events one could see in a war.

The objectives of an exercise drive the events and the play of the exercise. In the case of the CPX, the objectives follow the main purposes: to exercise plans, procedures, personnel, and communications. To that end, the objectives would be along the lines of exercising resupply; testing civil and military cooperation during crisis; evaluating interoperability of communications systems; identifying shortfalls; testing the adequacy of plans; and training logistics staffs for war. In a nutshell, the objectives all come down to training and being better prepared for war.

Real life events can also trigger inputs to the battle staffs, and many times provide "free play" beyond the script. However, free play is discouraged due to the scripted nature of the exercise. Major Perry notes in his article that CPX realism suffers from a lack of free play. He states that events during the exercise may change the original script, but the system is not designed to handle that sort of change (26:8).

Occasionally these real life events are outside of the objectives of the exercise, but since the battle staff is in session, it may choose to solve the problem. Events such as communications outages, aircraft mishaps, and logistics shortfalls provide stimulating problem solving for the decision makers on the battle staffs.

Once a response cell has an input for the exercise, either through the MSEL or free play, it takes any necessary action that it can at the unit or base level to try to solve the problem. Usually these inputs are not meant for the response cell to solve, but for them to take the appropriate action, such as sending a message to the next higher command level for resolution. In this fashion, the communications procedures are greatly stressed. Accurate reporting by the response cells is crucial for the decision makers on the battle staffs. Communications with the response cells is what drives the training for the battle staffs at the headquarters and subordinate commands.

As mentioned, the exercise may involve actual movement of forces, as in the field training exercise (FTX), or only simulation of forces, as in the command post exercise (CPX). Regardless, the purpose is training. In the FTX, training is for operational units to test their capability through field training under simulated combat conditions. In the CPX, the generals, admirals, and their staffs train to determine operational capabilities and shortfalls in a crisis environment.

The CPX combines some of the benefits of an FTX with those of wargaming. The wargame is less expensive than the FTX, because it does not deploy any forces. The CPX is also less expensive for the same reason, but not as inexpensive as the wargame. The training aspect of the wargame was on decision making; in an FTX, it is on operational capability. The CPX offers both. It offers a chance to look at the operational capability, as in an FTX, and concentrate on decision making, as in the wargame (17:22; 24:49).

The Purpose--No-Fault Mistakes

Exercises provide the opportunity to make mistakes and learn from them without the tragedies of real war (17:23). Valid exercises combine the elements of tactics, strategy, and logistics. In fact, strategic decisions become logistics decisions (23:13). Strategic decisions require logistics consideration to be truly valid (6:20; 23:14). It is faulty reasoning which results in stranded forces, when logistics

has not been considered adequately. Such an omission assumes that logistics will always support the strategy. That is simply not the case (8:13). This type of planning in the real world gets people killed, but in exercises it is only an error in strategy, often undetected or ignored. To get the true picture, joint consideration of logistics, operations, and strategy is crucial. When planning staffs fail to plan together, the exercise is apt to fail the realism test.

Realism can not be overemphasized. Adequate training stems directly from its application to real life. There was no disagreement in the research that exercises require realism. In fact, much to the contrary, the authors agree that realism is better than simulation (15; 21; 26).

Problems

There are problems and obstacles in the way of realism. Among those problems are: poor logistics practices such as ignoring "inconvenient" threats, regenerating assets at an unrealistic pace, using assets that are not actually available, failing to reduce forces through attrition, and various other faulty practices which permeate exercise scenarios (15:27; 21:76; 26:8).

"Tooth-Fairy" Logistics

When asked what would be your top priority for improving our logistics "go-to-war" capability, the Deputy Chief of

Staff for Logistics at Headquarters United States Air Forces Europe, Major General Campbell responded with the following:

> In short, we can improve our logistics go-to-war capability best by realistically exercising the present system. Let me expand on this thesis just a bit. My contention is that in every exercise, even the ones like Wintex-Cimex which are supposed to test the logistics base, we only allow exercise play to go as far as the loss of the first real operational sortie. We then holler "kings - x" and either halt or modify the play. I've observed this during Salty Demo, during Wintex, and during several other exercises which purported to test the logistics capability of USAFE. (18:22)

General Hansen, Commander of AFLC, when the researcher asked the question "What do you think of the level of logistics realism in our CPXs" commented that we practice "tooth-fairy" logistics--you wish for it and you get it (12). That type of logistics realism does very little good for anyone.

In a like manner, another problem with exercise realism comes from the exercise participants. There are too many "make it happen" exercises in which some higher up officer may bend the rules to ensure success of the exercise objectives. The practice of simulation to win the game, divorced from the realism of logistics, limits useful training, and may provide a false sense of security. When discussing why exercises always meet their objectives, Melos noted that "... you can justify any strategy if you slant the ground rules enough without really testing it" (21:77). A similar problem plagued the Japanese as they modelled the attack on Midway. Rules were bent; realism sacrificed; results ignored; and

they lost the battle with even greater losses than the model had originally predicted (9:38; 16:25; 19:11).

Too Many Exercises, Not Enough Experience

Another reason for an exercise not fulfilling its potential as a learning experience was noted by Lt Col Hoover in an article entitled "Logistics Realism In Exercises." He states that there are simply too many exercises. Each service has its own exercise; each theater has its own exercise; each major command has its own exercise. Everyone has their own exercises (30; 15:27-29). The USAF participates in exercises in virtually every corner of the globe. Exercises, like Wintex-Cimex and Gallant Eagle, occur every other year and in the off-year there is a complimentary FTX. Additionally, there is usually one big CPX every other Autumn which rotates between theaters with varying scenarios. Some of the commands, like SAC and MAC, participate not only in the major exercises each year for their own command and the JCS, but also in other service's exercises too.

In many cases the planners for real world operations plans (OPlans) are the same planners writing the exercises. This is not a bad practice, except that the number of qualified planners is very small. This division of time detracts from both the real-world OPlans and the exercise plans; likewise, with the even smaller number of well-trained logistics planners, such demands stretch their talents beyond their ability to provide accurate inputs to

exercise and real-world plans (15:27-29). Although Lt Col Hoover's article was written in 1984, it is still valid. In 1984 according to the Defense Monitor, there were 60 to 70 exercises directed or coordinated by JCS (30). Currently, there are 85 or more JCS level exercises each year. Many of the suggestions made in Lt Col Hoover's article require re-emphasis. The problems with planning and developing exercises still exist and have not improved much over the years.

Problems Without Fixes

Another problem is that problems identified in previous exercises are not resolved before the next exercise. Nifty Nugget, conducted in 1978, was an exercise similar to an FTX. The logistics shortfalls discovered in that exercise were many. The exercise uncovered some previously unknown conditions, such as improperly trained personnel, people not available to either ship or receive goods, and inadequate logistics plans (7:15). This exercise stimulated many changes to the exercise system, but the problems remain. In fact, Lt Col Hoover points out that, in 1982, the tremendous airlift shortfall that had been identified by Nifty Nugget, was no closer to a solution than it was in 1978 (15:27).

Nifty Nugget was an FTX, yet the same problems exist in the CPX. Melos noted that the Navy exercise problems carried over to the "paper war" (21:77). By not actively pursuing solutions to the problems, one of the purposes behind exercises is lost.

Script and Level of Play

In "Limitations of JCS Exercises", Major Perry identifies two problems unique to CPXs: script dependency and level of effort (26:8). Script dependency discourages free play because planners must create events to drive the players towards specific objectives. Limitations in the level of play also discourage realism by not having a complete information flow from the unit level to the headquarters and subordinate command battle staffs (26:9).

Costs

There are also cost problems--political and economic. Exercises, especially FTXs, have adverse affects on the countries where they are conducted. In response to this pressure from allied governments, the US has curtailed some exercises. Some exercises may have costs in the $60 million range (11:16).

Feedback

A final problem is feedback. There is limited feedback. Exercise after action reports identify some problem areas, but the decisions of the commanders are rarely critiqued regarding the soundness or whether the decision was faulty. There needs to be some feedback mechanism so the decision makers can modify their decision accordingly and so the next time, when the decision could be for real, their decision will be one of experience (11:16).

Summary

Exercises are a vital part of military training and there is a need for more logistics realism in Department of Defense exercises. The staffs and the decision makers have the right to the most realistic training they can receive in order to be better prepared to win a real war. These exercises, whether FTX or CPX, provide no-fault opportunities to practice war without the pain of war. The research shows that there is agreement on the need for exercise realism. Much of the research showed that strategy, tactics, logistics, and operations are often at odds, not only in exercise planning, but in real-world planning as well (1). Other problems identified in the literature still plague the exercise program, such as the level of experience of the planners. Shortfalls and limitations discovered through exercises are not being solved in a timely manner before the next exercise begins. Nonetheless, exercises are essential to preparedness. The literature agrees on the importance of an exercise program, especially in light of the diminishing actual combat experience in this country. In fact, without a war, the only way to obtain the required experience is through reading, exercises, or wargaming. Yet, for any of this to occur, the decision makers must decide in favor of realistic exercises. In order to be prepared to go to war, we must practice as we intend to fight the war.

III. Methodology

General

The researcher used a combination of methods to investigate the research questions. Each of these steps was necessary in order to fully explore the process of exercise realism. Historical research, literature reviews, observation and participation, personal interviews with experts and participants, data base formulation, and simulation using a model contributed to the research process.

Justification

The reasons for performing all these steps was to identify the problems which have occurred in the past through other exercises and provide a tool to improve the way we strive for realism. To do this, observation and participation provided "hands-on" experience as well as the opportunity to personally identify some constraints and problems. It also provided the opportunity to interview some of the participants of an exercise and to get their impressions of the exercise process. Additionally, there were several experienced logisticians and veterans of many exercises at the training session conducted prior to the exercise. During that session, there were ample opportunities to get feedback from some of the participants on exercise realism. Some of those comments are included in appendix B along with the interviewees' summarized comments.

Historical Research

Besides conducting a normal literature review, the researcher conducted historical research on the exercise program and problems with it. The research, conducted in the archives at the Historical Research Center at Maxwell AFB, Alabama, identified logistics related problems from previous exercise after action reports, message traffic, and other documents. Unfortunately, none of this information can be cited in this document due to the classification of the documents reviewed.

Computer Simulation

Any computer simulation or model is only one answer to a potential problem. During this research a simulation designed to enhance realism was constructed for use during CPX play. Its purpose was to provide information to upchannel to the battle staffs for their action. The model provides more realistic data because it is based on real world information from peacetime flying hours instead of a rough guess by a planner at the exercise planning conference held a year prior to the exercise. The goal of the model is merely to provide more realism within the constraints of the exercise. The information contained in the data base, which drives model results, stems from peacetime flying rates, time calculations for various procedures, Coronet Warrior spares calculations, and other logistics concerns.

Observation and Participation

The researcher observed the winter exercise known as Wintex-Cimex first-hand and participated as a member of the response cell in the role of a logistics plans officer (AFSC 6624). The duties of the logistics plans officer make him responsible for all areas of logistics including, maintenance, medical services, civil engineering, supply, transportation, and fuels. In this manner the researcher became familiar with the most current CPX environment.

Quasi-Experiment

Using the data base generated from peacetime flying rates and a computer simulation model, a response cell can obtain an output of sortie capability or availability for each day of an exercise. In addition, the model lists some logistics sustainability problems such as spares availability; maintenance information, such as time to repair; and fuel consumption rates. In follow-on tests of the model, it should be operated using the actual exercise parameters of sortie type, duration, and length, concurrently with the normal exercise procedures. Then, the model can be accurately compared to the real world and modified, if required.

Interviews

U.S. Air Force exercise experts were identified in several of the major commands' and components' (SAC, TAC, USAFE, MAC, 9th AF, PACAF, and 12th AF) exercise planning

functions and from the Air Staff exercise planning function. The researcher conducted interviews with those experts to get their impressions of the way the USAF exercises and attempts to attain logistics realism. Additionally, the interviewees were asked for their suggestions on ways to make exercises more realistic. The author also interviewed exercise participants from Wintex-Cimex 89 and other exercises to get their inputs regarding the realism aspects of the exercise. From this group representing each major command and using their collective experience, some observations about the way the exercise program operates and the logistics realism of it can be made.

Previous Experience

As a participant in the exercise process in previous assignments, the researcher also relied on his past experience. One of those assignments was at the unit level where the researcher participated as a member of a CONUS-based response cell. Another assignment was as the Chief of Pacific and American contingency plans and exercises at Headquarters Strategic Air Command, where he planned exercises from the concept development phase through and including execution. The researcher also served as advanced party echelon to USCINCPAC and PACAF from SAC, as logistics advisor, as a member of the battle staff, and as a member on the exercise control staff.

IV. INTERVIEWS

General

Thirty-three individuals who have experience with Air Force command post exercises were interviewed to get their impressions of the USAF exercise program. Questions focused on the degree of logistics realism in the exercises. The informal structure of the interviews had both a positive and negative effect on the research. On the positive side, the informal nature of the interviews allowed a free flow discussion. Some of the comments were definitely not the party line. Some comments could even be considered controversial. The open structure also provided a means for some of the respondents to vent their frustrations with the system, and through that process, they provided some interesting insights into why the USAF exercises the way it does.

The negative aspect of the informal structure was the difficult nature of the analysis it required. In most cases, all respondents answered each question; however, there was a good deal of unsolicited information in their answers. The analysis contains some of those unsolicited comments.

The questions were grouped into three categories: personal information questions, mixed quantitative and qualitative questions, and those that were strictly qualitative. Individuals were interviewed in person or by telephone during June 1989. Their comments are summarized in appendix B.

Interview Process

The individuals were selected on an ad hoc basis. The researcher either called individuals who worked in the exercise branches at the different commands or was referred to certain individuals by other interviewees. From the major stateside commands, the individuals selected worked in that major command's logistics exercise division. Within those commands, the division chief was asked who on his staff would be the most knowledgeable people to speak with on the subject. Those individuals were then interviewed. Personnel from 9th Air Force and 12th Air Force logistics exercise divisions were interviewed based upon referrals from other logisticians. Locally at Wright-Patterson AFB, several persons with exercise experience were contacted. Individuals who participated in the Wintex-Cimex 89 exercise were also interviewed. Other individuals in the grouping came from USPACOM, USAFE, HqAF, and JCS. These people were not selected strictly by convenience, nor were they demographically chosen at random. These are people, who by virtue of their duties and by their Air Force experiences, could speak knowledgeably on realism in CPXs.

In the summarized comments in appendix B, the individuals remain anonymous and are identified by numbers, not names. For the quantitatively measured answers, their response is in parenthesis. Their comments are strictly their opinions, but from these comments, we can make some

preliminary judgements about the exercise program and the level of logistics realism in those exercises. Questions one through nine will be looked at in more detail. Question ten was a catch-all question for after thoughts and any comments from this question were incorporated into the appropriate question on the form.

Question 1, Background

What are your experiences in USAF exercises?

a. What was the exercise name(s)?

b. When was the exercise(s)?

c. What was your organizational level (i.e. response cell, battle staff, exercise planner)?

d. What was your rank and AFSC?

e. What job did you hold during the exercise?

Rank. The interviewees' ranks ranged from a MSgt through Colonel on the military side and from GS-11 to GS-14 on the civilian side.

Experience. The experience level of the interviewees' ranged a great deal. The individuals interviewed as a result of their experiences at Wintex-Cimex had participated in two exercises. Some of the more senior logisticians have "too many exercises to count" as one of the respondents said. The greatest amount of experience was 23 years as a logistician participating in exercises in the Pacific, Europe, and CONUS. The average time was just over six years experience participating in exercises.

Their levels of participation were varied too. Some had only exercised at the response cell level. Others had experience at the regional or command Logistics Readiness Centers (LRCs) or their equivalent. Others held positions as exercise planners on the MAJCOM or headquarters' staffs. Still, some others had experience on their command's battle staff or as members of the exercise control staff.

Although this group may not be the most qualified, they do have a wide range of experiences, and by nature of their duties and positions, they have the expertise needed for this research.

Questions 2 through 6 were both qualitative and quantitative in nature. For the quantitative portion, the questions used a one to seven Likert rating scale (See appendix A for the actual interview instrument).

Question 2

"In your opinion, on the following scale, do we meet the objectives of the command post exercises? Why or why not?"

Fail to Meet			Adequately Meet			Always Meet
1	2	3	4	5	6	7

As displayed in figure 4-1, the consensus is that we tend to do a reasonably good job of meeting the objectives of the exercise. The group had a mean of 4.39 and a standard deviation of 1.09.

Some objectives are not met, some can not be met due to the nature of the exercise, and some we design to be met. On more than one occasion in the interviews, the comment was made regarding designing objectives so they can be met, rather than testing to find problems. Another issue involved whether or not the correct objectives are being established for command post exercises.

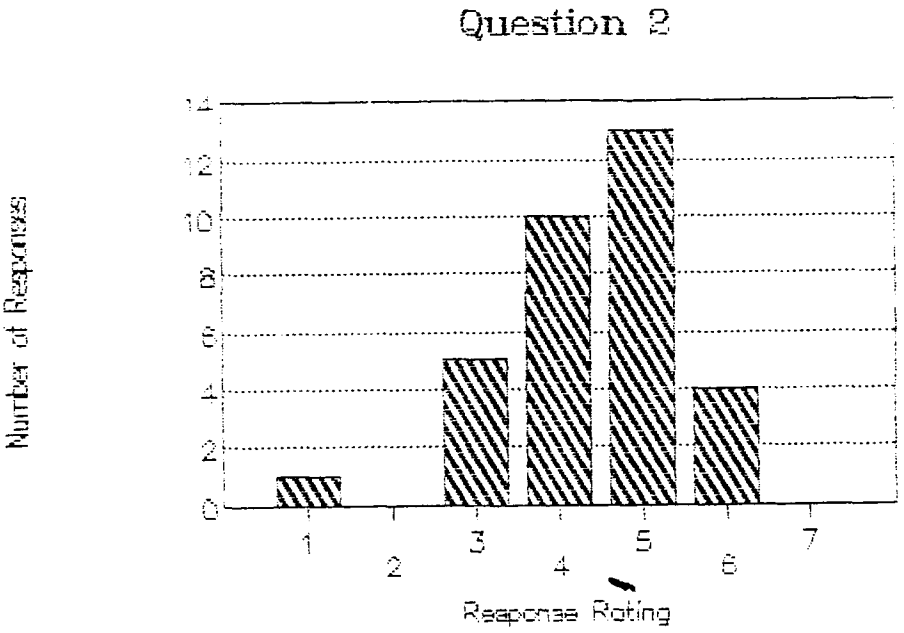

Figure 4-1. Question Two Results

Another frequent comment regarded the exercise developers' and players' role in attaining the objectives. It is their responsibility when designing the exercise to make events believable and in harmony with the objectives. It is the players role to provide adequate responses to the events.

Working in harmony, these two dynamic events can determine the success of the exercise.

One other possibly significant comment concerned the fact that the personnel playing the exercise are not necessarily the ones who would be doing the job in a war. The respondents felt that this detracts from both the realism and success of the exercises.

Question 3

"As rated on the following scale, do you think logistics matters receive sufficient attention during command post exercises? Why or why not?

Not enough Attention			Sufficient Attention			Too much Attention
1	2	3	4	5	6	7

Nearly 50% of those interviewed answered with a 3 on the Likert scale, slightly below the Likert rating of 4 which is "sufficient attention". The mean on this question was 3.18 with a standard deviation of 1.21. From the comments it can be inferred that logistics considerations take a back seat to the operations interests of flying the tasked sorties during the exercise.

Of the logistics items receiving attention, most mentioned fuel and munitions as being common items considered in an exercise. Noticeable in their absence were spares, maintenance actions, and transportation. When logistics matters interfere with the actions of the exercise, the

respondents allege that they are wished away or scripted out of the exercise. Part of the reasons cited for the lack of logistics play were: it is an operation's war, lack of experienced logistics personnel in the field, and the constraints imposed by the exercise.

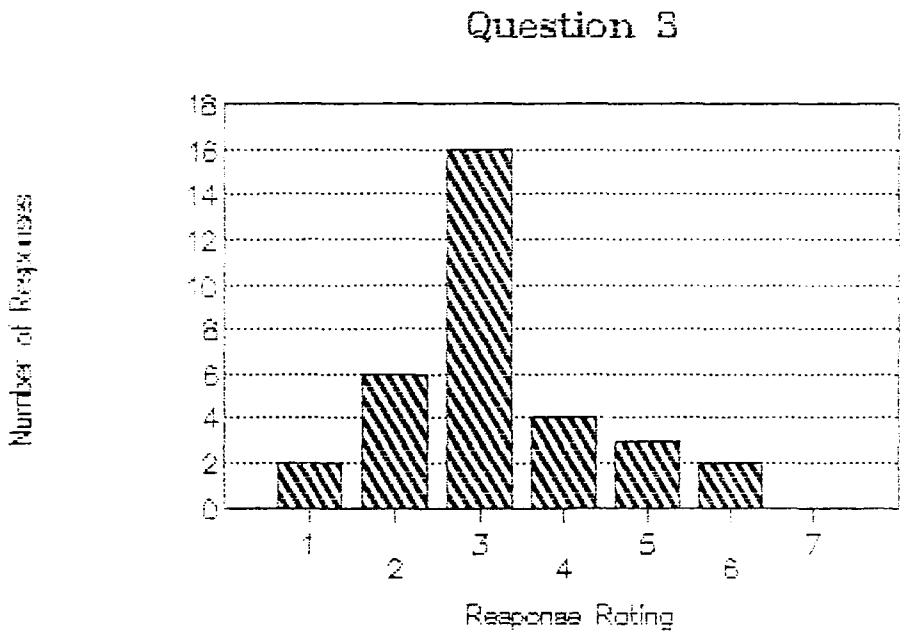

Figure 4-2. Question Three Results

Question 4

"In your experience and on the following scale, to what extent are logistics inputs considered when tasking sorties during a command post exercise?"

Not Considered			Adequately Considered			Over Considered
1	2	3	4	5	6	7

As seen in the figure, there were a wide range of opinions on this issue. The most common answer was 2, the mean was 3.30, and the standard deviation was 1.80. For many of the same reasons as in question 3, this question was rated less than "adequately considered" on the Likert Scale. The presumed reason is that in order to drive the exercise, there needs to be flying, so logistics play is limited. Consumables like fuel and munitions are looked at, but even they typically do not stop sorties from flying.

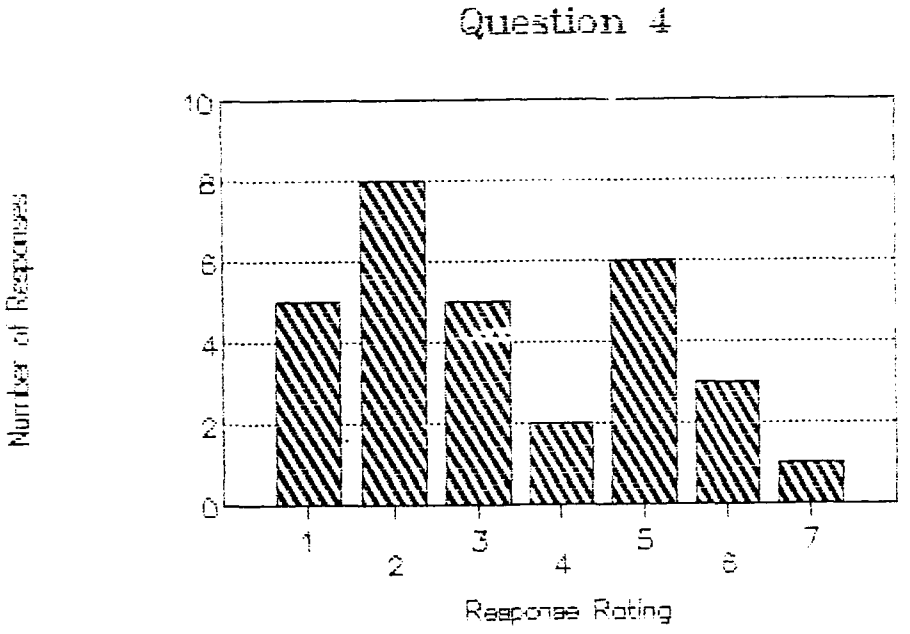

Figure 4-3. Question Four Results

Some of the interviewees' comments conclude that the operations and logistics personnel simply do not talk to each other. Each side is busy doing their own thing, writing

messages, or trying to figure out what to do. At times there appears to be an adversarial relationship between the two.

Improper or inappropriate MSELs also play a role in this question according to some of the comments. If the exercise designers and players were better trained and the MSELs better designed, more logistics play would ensue.

Question 5

"On the following scale, how realistic do you think command post exercises are? Why?"

Not Realistic			Somewhat Realistic			Very Realistic
1	2	3	4	5	6	7

The answers this time came out to be an almost normal distribution curve with a mean of 4.09.

One comment stands out from among the many responses and it was mentioned by several of the interviewees. The gist of the comment is that the level of realism is lower because there is no opponent, no one who counters the moves of the battle staffs as would occur in wartime. The same thought processes are at play on the part of the battle staffs and those in control of the exercise.

Another issue raised was that in many cases units are not playing or they are participating, but at a limited level. This requires much creative play on the part of the headquarters' staffs in order to generate the information which would be coming from these units. Simulation, pretend-

ing events actually took place, without knowledge and the actual data detracts from the realism of the scenario.

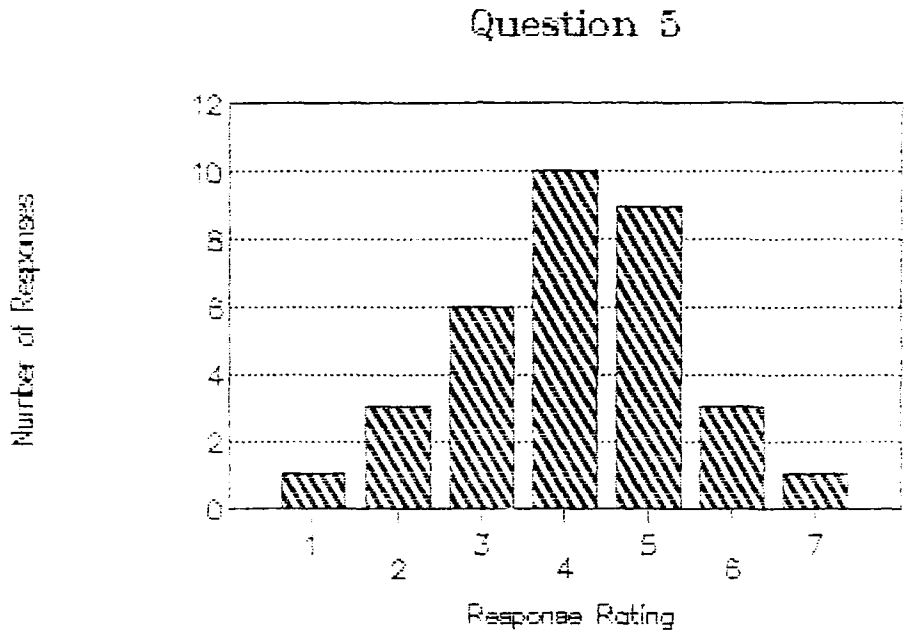

Figure 4-4. Question Five Results

Several commented that intelligence and operations had more realism than logistics. This may be because of the time compression or the scripting out of logistics issues. Noted among those comments was that as a Service, we do not take a good look at the synergistic effects one input has on others. We look to answer the message or tasking rather than how the input effects other things on the base.

Another comment mentioned quite frequently, especially from those who participated on a headquarters staff, is that the realism slipped by the wayside in order to prepare slides for the next day's briefing. The respondents felt that there

was too much of that kind of action during the exercise and less attention paid to the real reason they were there. Building briefings is not the purpose of a CPX.

Question 6

"In your opinion and on the following scale, did the command post exercises which you participated in, provide useful training for you or for those with whom you worked? If so, comment on the nature of the training and if not, why not?"

No Training			Adequate Training			Very good Training
1	2	3	4	5	6	7

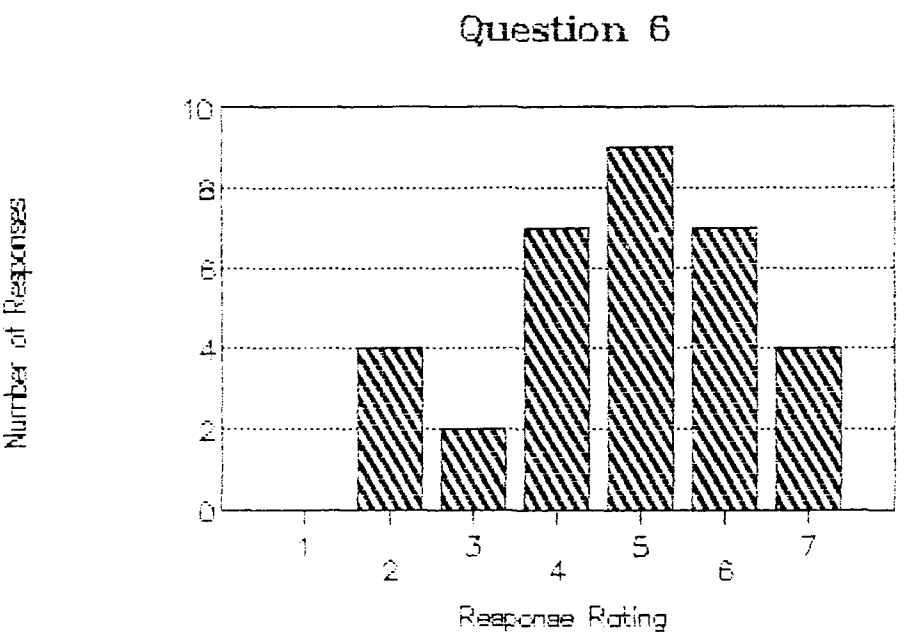

Figure 4-5. Question Six Results

The range of responses was large, but most agreed that they did receive some form of training. The mean for this question was 4.76 with a standard deviation of 1.50.

The best training it seems was procedural, which is one of the objectives of the CPX. Many respondents felt that the training was best regarding coordination--who to talk to, who does what to whom, reporting procedures, and hands-on experience. Generally speaking, the newer players responded with the highest level of training received. This would be expected. The more experienced participants, although still learning from each exercise, received less benefit from them. There were very few comments addressed to unit or organizational training.

Additional benefit is also derived from playing at a level which normally the more senior people would do in a crisis. This was noted as a problem area earlier, but here it is expressed as an advantage. Many of the senior personnel do not actively participate in CPXs and so the opportunity is there for more junior personnel to experience some of the intricacies of the exercise.

The remainder of the questions were qualitative in nature, and provided some interesting insights into the exercise program. The purpose behind the interviews was not only to find out what the Air Force does poorly, but also to discover what others think Air Force command post exercises do well. This was the purpose behind question 7.

Question 7

"What do you see as the benefits of a command post exercise?"

For some of the answers, respondents provided standard responses like it is less expensive than conducting a full-blown exercise each year. Most of the respondents commented on the advantages of training in a no-fault environment, testing the command and control systems, integration, and coordination, and familiarity.

Evaluate Procedures. The principle objective of the CPX and the logistics participation in it is to evaluate existing procedures and policies. The CPX is designed to test procedures and included in that would be command and control as well as integration and coordination between the staffs and subordinate units.

Training. Familiarity and training likewise go hand in glove. The training aspect of a CPX is largely dependent upon the hands-on training with such things as reporting systems, foreign procedures, and familiarization with response cell facilities, equipment, and the location itself. It also allows the players to "experience" some of the fog of war with the overloaded communications networks, the mildly stressful conditions and fatigue of a response cell or battle staff location.

Test Plans. The CPX also allows plans to be tested on a limited basis. In a few instances, some of the things which

were written in the plan will prove to be incorrect. CPXs can identify problems so that a change could be made to a plan at the next revision. One of the respondents also described testing locally developed procedures during the CPX. Some of the things they had assumed would work at their forward operating location (FOL), did not work. The CPX pointed out procedural inconsistencies to that response cell and local training policies could be changed accordingly.

More than one interviewee commented that the CPX afforded the opportunity to practice as we intend to fight. However, several individuals noted that we do not do this well. Often times there are procedures and systems developed for the exercise which are used neither in peacetime operations nor planned for use during a crisis.

Question 8

"What are the major impediments to better logistics play in a command post exercise and how would you suggest overcoming them?"

Unrealistic Data Base. There was a wide range of answers to this question, but three comments occurred frequently. The level of detail to which the CPX is played from a logistics point of view is inadequate. The MSEL items do not get down to the level of spare parts, and generally, spares are not played unless via the MSELs. The comments inferred that the logistics data base needs to be realistic and believable and, since no forces are moving, there is a

tendency to simulate everything. With a believable data base, this tendency may be lessened.

Synergism. Also noted in the comments was that the events which are played do not run their full course. The synergistic effect one event has on others is not played to the fullest extent. For example, a terrorist attack on the base destroys a few buildings in the supply complex. What are the effects to the base? What was in those buildings? Who was killed or wounded and what were their AFSCs? What equipment was lost? What capabilities has the base lost? The list goes on. Too often, the event is played for one aspect alone, such as manpower reporting. If a transport aircraft falls out of the flow, what is the effect? What parts and equipment do not arrive on time? Does that effect sortie production?

Wrong People. People are another problem with logistics play according to the interviewees. These fall into two categories--the wrong people and inexperienced people. The wrong people play logistics. This does not mean everyone in the logistics element on the response cell or battle staff is the wrong person, but the emphasis is not there to get the right players. The problem begins at the top of the command structure. Many of the positions tasked to be manned by a more senior officer, are manned with that officer's deputy twice removed, a junior officer, or an NCO. Several comments indicate that senior level staffers need to treat exercises

more seriously. Staff positions should be manned with the individuals who are slotted against them in wartime.

At lower organizational levels, our best people are regarded as too indispensible to participate in exercises. These are the men and women who do the day-to-day work for the various logistics functions on the staff. Respondents alleged that if these people do participate, it is for only one or two 12-hour shifts and that simply is not enough because much time is spent bringing a new shift up-to-speed. The daily routines of peacetime still move on in spite of the exercise, but higher level attention must be given to ensure the best players are in the right positions.

The interviewees commented that the level of play is not consistent. Much of what goes on in a war would, in all reality, come from the unit level and flow up the channel. In an exercise, the opposite occurs, due in large part to the sparse number of units who are participating. Even the units who do participate only play with a response cell of a few people and sometimes even those personnel are on call. In order to get the logistics systems working properly, the bases must be involved in the exercise or adequately simulated.

Inexperienced People. It was noted that the experience level of not only the logistics participants but also the rest of the response cell is normally limited. There is a lack of wartime experience in a large percentage of the

logistic personnel. Several respondents agreed that few logisticians understand exactly what it takes to get things from place to place. Few logisticians understand all the facets of aircraft generation, recovery, and launching. The scope of their duties is immense and trying to grasp it all during a CPX is impossible. There is also the feeling that just because someone has an AFSC does not necessarily make them knowledgeable of his or her duties. Often these inexperienced logisticians are on the response cells.

Time Constraints. According to the interviewees, a final impediment to better logistics play during the exercise is time. Time is the thief of logistics. It robs the logistician of the opportunity to play transportation and requisitioning issues. It steals the chance to play "real time" recovery actions and turn times. It creates the magic of "smoke and mirrors" when the tank farm is repaired in record time overnight. Time to play logistics is not readily available in a two week exercise. Even when it is there, it is rushed forward to get to the next event. Many of the respondents acknowledged that every event can not be played for the duration it takes to accomplish it. The USAF can, however, play maintenance turn times more realistically as well as transportation issues. It can plan the exercises more carefully to ensure fuels shipments do not arrive "overnight", but are carefully thought out to arrive on time and in adequate quantities.

Question 9

"Do you have any suggestions to improve realism during a command post exercise? If so, elaborate."

The comments from question 9 parallel closely many of the other questions. Not unexpectedly, many of the comments mirrored the comments from question 8.

Senior Level Involvement. The respondents agreed that senior level emphasis and participation from the very beginning is critical to getting the whole project off to a good start. Make a decision to commit the good people to man their required billets for the exercise. Have all agencies participate in the exercise, but if one must be simulated, have someone knowledgeable do it. A bad simulation has snowballing effects.

Data Base Improvement. A common answer to question 9 was that the logistics data bases need improvement. The MSELs need to pass the realism test. Efforts should be made to play different things occasionally, instead of the same MSELs every exercise. Allow the system to actually run out of things once in a while. Allow the response cells to use what would actually be expected on their forward base, and if the fuel system is blown up or has been ripped out in real life, play it that way.

Training. Training was noted as a key to improving exercise realism. The operations staff, along with the logistics staff needs to be fully cognizant of what it takes

to accomplish sortie production from a logistics perspective. It can not be overemphasized just how important the decision maker's need to know what the real capabilities are, especially in light of the fact that the decision maker never gets critiqued on the decisions he or she made. Operations can not function without logistics and logistics has no reason to be except to support operations.

Computer Simulations. A few respondents spoke of using computer simulations or even the wargaming center to help add logistics realism. Since wargames are more decision oriented than the procedurally oriented CPXs, this holds some hope. Set the stage with the wargame and use the CPX to test the procedure. Simulations may have a place as well. A simulation can add the time element to calculations, instill some randomness, and provide some added realism as long as the inputs and modelling parameters are correct.

Logistics Exercise. The final two comments are tied together in some respects. As in question 8, time is a factor. Running the exercise longer could provide that needed time element to more fully develop the logistics participation. Along a similar line, several commented about holding a purely logistics exercise, which would sacrifice some of the operational aspects of the exercise to test some of the logistical elements.

As mentioned, question 10 was a free flow, catch-all question to talk about any issue related to realism, logis-

tics, or exercises. The comments from this question are covered in some manner in one or more of the other nine questions.

Summary

Based on the interviews, the research highlights many problems with the methods used during CPXs. Several solutions were proposed, but many of the issues do not have readily available answers. Some aspects of the exercise program are very beneficial, especially in the areas of command and control training and hands-on experience. It appears that there are many needed changes which are discussed in Chapter VI.

V. The Computer Model

General

Computers are by no means the answer to all of our problems, although as a military service, the Air Force has invested heavily in computers to improve its management techniques. The computer is a tool. It can make many time consuming tasks and repetitive, mundane tasks much easier for the users. It can also be a useful training tool to teach people how certain things, such as the logistics considerations necessary to launch a sortie, should be done.

A few of the interviewees commented about the potential of computer simulation during a CPX and two of the articles addressed it as well (20:14; 11:16). The researcher believes simulation has a place too. This research does not address the use of computers during an actual crisis, nor during the development of this model was it ever envisioned for use during combat. This model is designed to be used as a training tool for use during CPXs or local training exercises. Its purpose is to help make the actions within a response cell more realistic, given the experience levels and limited numbers of personnel actually assigned to response cells. It was also designed to provide better inputs from those response cells to the higher decision making levels and thereby add to overall realism as it relates to the logistics system.

The logistics system is difficult to model in its entirety, so the researcher chose to model only the most important elements which together largely determine sortie production. Simulation makes it unnecessary to address every element of the process so long as the key elements are considered. A simulation model is designed to produce some form of predictable behavior representing the process which it describes. It is used as a predictive tool to make valid statements about that process.

Currently, the logistics resources which are consistently played by response cells are fuels and munitions. Other elements of logistics such as transportation, maintenance, and spare parts are given much less attention, if any. Fuels and munitions are looked at in gross numbers, resulting in binary evaluations of the "yes we have them, no we don't" type. Maintenance actions are given virtually no consideration during a CPX, although without those maintenance actions, the planes would not fly.

Spares are considered through MSEL actions, but they are generated to force some decisions at a higher level than the unit. Units get very little action in determining spares. Usually, these MSELs are designed to test reactions to a loss of a certain resource category or individual supply item. Unless there is a specific MSEL which breaks a sortie, spares are given little consideration at the unit and during the exercise. As pointed out earlier in this study, JCS has

expressed concern that there is not enough logistics play in a CPX, and that the military must do better to get the most from exercise dollars and to provide players at all levels a better picture of what would happen during a crisis. The purpose behind this simulation model is to provide a tool to aid in the improvement of exercise play.

Model Development

The model was built using SIMPLE_1, version 4.0, which is an integrated simulation software package developed by Sierra Simulations and Software Company. Simple_1 is an integrated modeling environment for use with simulation and related activities. The Simple_1 RUNSIM run time module can be used to compile the source code to allow the program to be exported as a stand-alone piece of software. When formatted in this manner, it is not proprietary software, so any unit may use it without actually owning Simple_1. It operates on the Air Force standard computer, the Zenith 248, or any other IBM compatible machine (3).

The user interface was designed to keep things as simple as possible for response cell personnel. A user's guide has been developed to explain the operation of the program and is included as appendix D.

The package provides four screens--two simple input screens shown in figures 5-1 and 5-2, one information screen, and the output screen. The first screen encountered is the menu screen. It is created by an MS-DOS batch file designed

for editing or running the program. It consists of the five options listed in figure 5-1. To activate any of these programs, the user types the indicated statement.

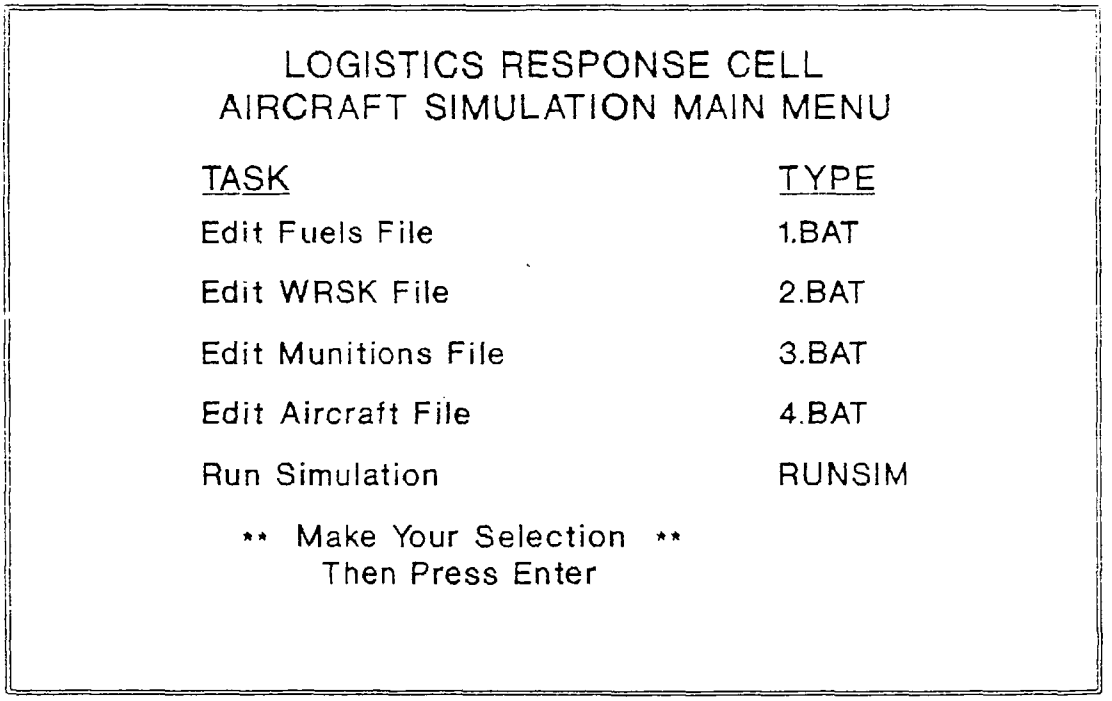

Figure 5-1. LOGSIM MAIN MENU

The second screen encountered is the introduction screen which gives acknowledgement to the developer of Simple_1 and provides the theory behind the model. This screen will only appear in the first few minutes of the simulation. After that time, the program will go directly to the simulation parameter input screen.

This input screen is designed for entering the parameters for the model run. These parameters are listed in figure 5-2. Entry for this screen too, requires only basic typing skills. Common language used by planners and response

cell participants is used within the questions. Where there may be some doubt, the user's guide is available for reference.

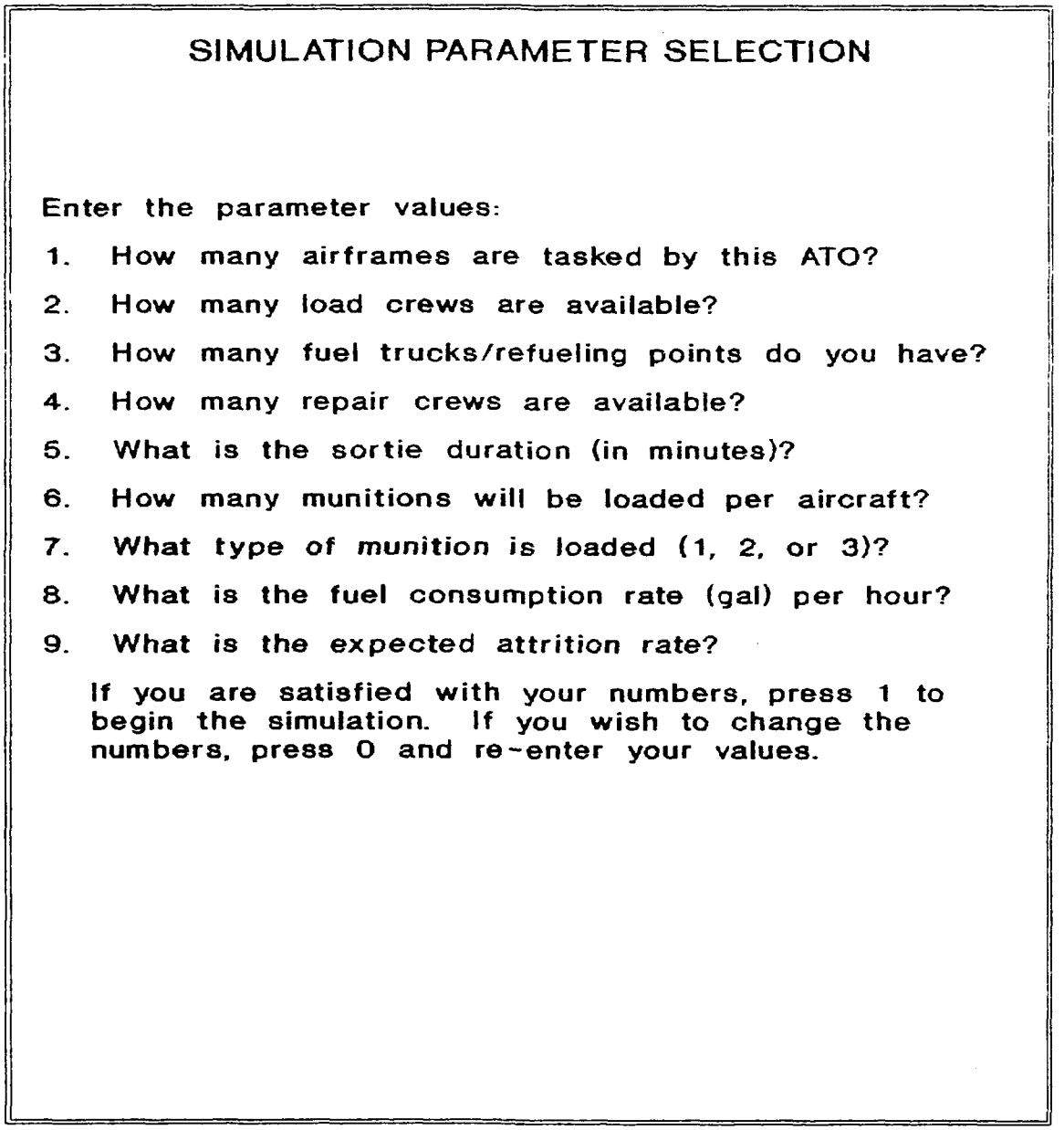

Figure 5-2. Simulation Parameter Screen

The final screen is the output screen which provides an illustration, both graphically and numerically, of what is taking place inside the model.

Model Description

This model responds to an air tasking order (ATO) arriving at the response cell and prompts the response cell for some inputs. The model computes munitions consumption, spares usage, fuels consumption, and attrition. In addition, it deals with the time lines involved in accomplishing these actions. The model is not aircraft specific. The inputs for the model are the munitions data base, the War Readiness Spares Kit (WRSK) data base, the aircraft data base, and the local fuels storage details. For some of the larger and older aircraft, such as the B-52 or C-141, this model may require some adjustment in the parameters it sets for maintenance actions and refueling. This adjustment would be made in the program code and therefore would be performed by the developer, not the user. The model is generic enough to apply to most tactical aircraft although the test used F-16s.

Facilities are provided to allow user to update the information contained in the data bases in the event of resupply or a non-sortie related consumption. It permits simulations based on the actual resource levels present on a base. The model also allows AFLC in conjunction with the operating commands, to input a list of spare parts for each

unit's use during the exercise. In this manner the logistics system can be exercised in specific probabilistic ways. The ability to adjust resource levels provided by the model has the potential to add to the realism of an exercise.

The Program

The program code begins with a declaration of all the variables which will be modelled. That is followed with a listing of the files which will be required to operate the program, a description of the screens in the program, and then the model logic itself. The code is contained in appendix C.

The model incorporates user inputs, various statistical distributions, and timing criteria to model the airframes' tasking through the mission combat sortie and postflight cycle. The specific user inputs were previously shown in figure 5-2. If the user makes an error in entering the data, there is also opportunity to change the entries prior to program execution. A debugging feature was added to provide an "error" message to the user if he enters an invalid or out-of-range parameter. Figure 5-3 lists the limits on each of the inputs.

The information required for these inputs can be obtained from the maintenance or operations organizations at the unit, the unit's planning documents, and the host base's planning documents and account records. To get reasonable

output from the program, users will have to do some research prior to the exercise to obtain realistic information.

LOGISTICS RESPONSE CELL PARAMETER LIMITATIONS

PARAMETER	LIMITS
Airframes	1 - 36
Load Crews	1 - 20
Trucks/Refueling Points	1 - 20
Repair Crews	1 - 20
Duration	1 - 720 (minutes)
Munitions	1 - 5000 (per sortie)
Munition Type	1 - 3
Fuel Consumption	1 - 5000 (gallons)
Attrition Rate	.01 - 1 (per sortie)

Figure 5-3. Parameter Limitations

Other information may be provided for the user by higher headquarters or some other agency. For example, the spares information may well arrive at the unit in a diskette from their MAJCOM or perhaps from AFLC. In this manner the spares the unit will use will be controlled by some outside agency, thus ensuring consistency for all units.

The activities in the model incorporate a simplified flow of the sortie production process as displayed in figure 5-4. The actions within the model begin with the number of aircraft tasked via the ATO. Initially, the aircraft are

sent to preflight, where a lognormal distribution is used to determine the time required to accomplish the task. The parameters chosen for this activity are 40 minutes for the mean time required with a standard deviation of 5 minutes.

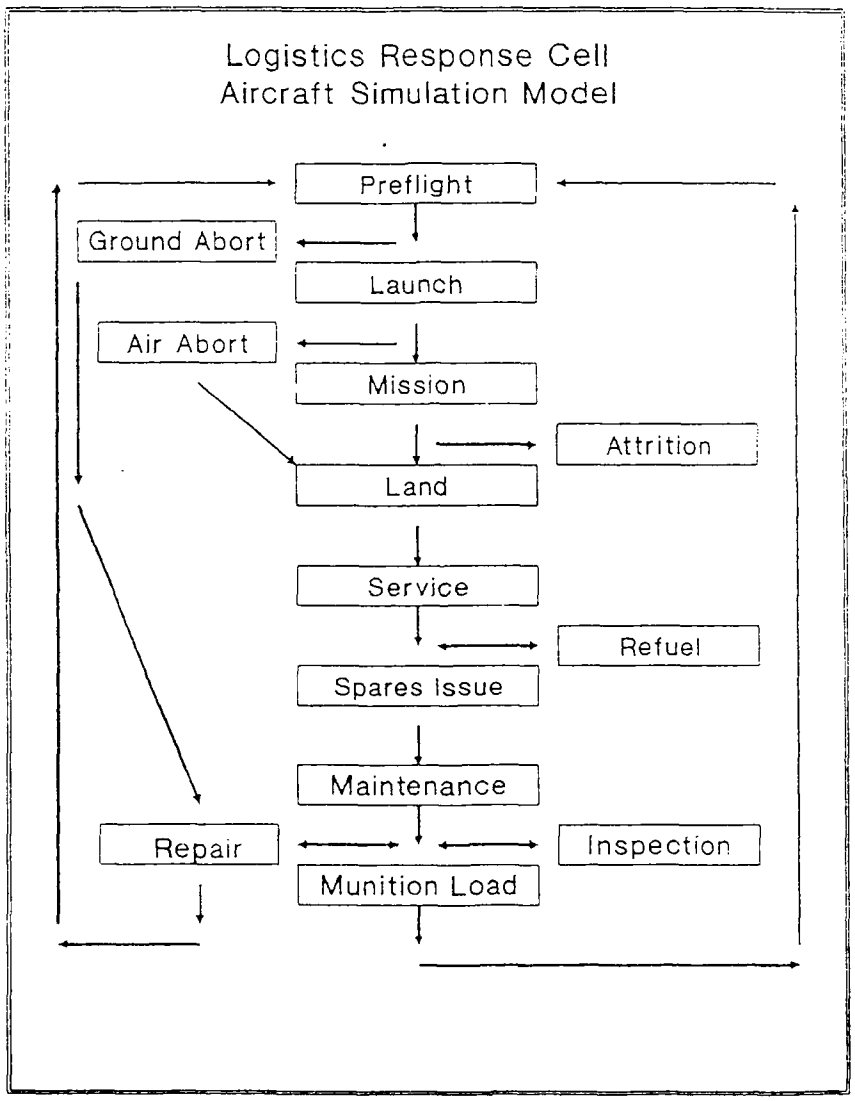

Figure 5-4. Simulation Flow Chart

After preflight, the sortie runs through an abort check where it has a three percent chance of either a ground or air

abort. If it does not abort, it flies the mission. Mean mission duration is provided by the user during parameter selection and varied using a lognormal distribution with a standard deviation of 15 minutes. If the aircraft ground aborts, it is sent to maintenance for repair, bypassing the refueling section since it has nearly full tanks. If it air aborts, the aircraft goes to the servicing section for refueling and then on to repair.

Once successfully launched, the aircraft can either return from the mission and complete the programmed actions or it can be attritted. If the aircraft is attritted, the file for the number of aircraft assigned will be reduced by one airframe, the fuels and munitions files will also reflect the loss of the gallons and weapons, and that sortie will exit the program. If the mission is complete and the aircraft returns, it enters the refueling section of the program for servicing.

In the servicing section, a triangular distribution was chosen to represent the process with a minimum time of 20 minutes, a normal time of 23 minutes, and a 27 minute maximum time for servicing. A running total of the amount of fuel left on base is displayed on the output screen. The total on-base storage is reduced by the estimated consumption attributed to that sortie. This section allows the number of aircraft to be serviced simultaneously to be equal to or less than the number of refueling points available (R-5, R-9, hot

pits, etc). This provides some level of realism to the process via the time element, instead of having all aircraft serviced instantly upon return from the mission. It takes into consideration varying degrees of proficiency by the fuels personnel, pumping rate variations, and equipment differences.

The next section of the program is the spares section. This part of the program calculates the spares consumed by each aircraft. Any WRSK may be used for this section. The input file used in the test model was derived from the Coronet Warrior WRSK along with the on-hand balances and probabilities of consumption from the exercise. This WRSK was selected because the nature of the Coronet Warrior exercise was to fly at a close to expected wartime sortie rate and duration. The test kit had only parts which had actual usage during Coronet Warrior, all others were extracted. This made the file more manageable by eliminating items with a "zero" probability of issue. Ninety-nine items still remained after the extraction from the kit. The entire kit is shown in appendix E.

The program uses random number generation based on a random seed and on the simulation time of the program to compute the probability of failure. This was done to ensure more randomness in the selection of the parts from the kit. The program then compares the random number to the probability of failure for each part in the kit. If that probability

of failure is greater than the random number, then that part from the kit is shown as taken from the kit (issued or consumed) and the on-hand status reduced accordingly. This test is performed for each part in the kit each time an aircraft completes a sortie. Therefore, this creates 99 random numbers for each aircraft. For example, if the random number chosen was 0.01300 and the part it was compared to was the main landing gear tire, which has a probability of failure of 0.049918, then one main landing gear tire would be simulated as issued from the kit.

There is also a file written for historical purposes which allows the response cell to see the items issued over the course of the exercise and provides a good reference for comparison at a later time. The file gets very large, very quickly. It must be printed after every 75 sorties and then deleted from the disk. The simulation model will create another one during the next run. If it is not deleted, the program will eventually abort due to a lack of file space.

After servicing, the airframes progressively enter the inspection, hourly postflight (HPO), and munitions loading activities. Percentages were assigned regarding the number of aircraft entering the HPO maintenance, park, or through the 2B inspection. Lognormal distributions were applied for the HPO and 2B inspection. Hourly post flight assumes a 120 minute normal time to accomplish the activity with a standard deviation of 30 minutes. Through flight uses a minimum time

of 45 minutes, a most likely time of 90 minutes, and a greatest time of 120 minutes. The 2B inspection has a normal time of 60 minutes with a standard deviation of 10 minutes. These blocks in the program provide some additional realism by considering the time it takes to turn sorties.

The munitions file is adjusted based on the type and quantity of munition used for that ATO. Three munition types are allowed in the program data file. The on-hand balance is adjusted after each aircraft runs through the activity. This assumes that the aircraft drop all their required munitions or expend all their rounds of ammunition. After loading, aircraft are considered ready to fly and the simulation terminates.

Editing The Files

Users can change the information contained in the resource files with any text editor which can produce an MS-DOS text file. In addition, a batch file written in MS-DOS presents a menu (figure 5-1) to prompt the user to update the fuels file, WRSK file, the munitions file, or aircraft available file, as well as to run the program. A list of the files and their limits is shown in figure 5-5.

Verification And Validation

In any simulation endeavor, validation and verification are important. Verification considers the internal workings of the model, focusing on ensuring that the program language

and implementation of the model is correct. Validation addresses whether or not the model conforms to reality.

LOGISTICS RESPONSE CELL AIRCRAFT SIMULATION FILES

FILE	PURPOSE	LIMIT
A:ATTRIT.DTA	Monitor Aircraft Attrition	1
A:FUELS.DTA	Monitor Fuel Consumption	1
A:MUNITION.DTA	Monitor WRSK Consumption	99
A:MUNITION.DTA	Monitor 3 Munition Types	3

Figure 5-5. LOGSIM FILES

The key to the model was simplicity. The researcher had a few goals in mind when the model was designed. The purposes were to supply some measure of additional realism to exercises, and to supply a teaching tool to help the less experienced logistician learn some of the concepts involved with sortie generation and recovery.

Hand calculations of the model show that the parameters for each of the files check out properly, i.e. the calculations for the fuel, WRSK, munitions, and airframe reductions work as expected. The internal report section of Simple_1, which is not included in the response cell version, also

confirmed model verification. As the program was developed, various parts were tested individually to ensure accuracy. To ensure randomization, the system time was used as the seed for the random number selection in the WRSK comparison. Each resource file was tested separately and with the other files in the program. The process was an iterative approach of build, test, fix, build, test, fix.

The validation portion of the simulation process was more difficult to do. The program is in the prototype stage, therefore it has not been field tested. The tests which have been accomplished only address whether or not the model was an accurate predictor of WRSK use, based on Coronet Warrior data. Those results, included R-squared values greater than 0.98 when performing an all possible subset regression on the values. In addition, the Spearman rank correlation statistic was greater than 0.92 for over 1000 sorties processed through the model. This shows the model tracks the Coronet Warrior data well.

Whether or not the model provides additional realism to a CPX is another matter. The only way to assess its utility is through field testing. The ultimate objective is to get it tested in a CPX parallel to the normal procedures of the response cell. After the exercise, the user's, as well as higher headquarters, would be asked for recommended changes to the program and whether or not they felt it was a useful

tool for them. Time and the JCS exercise schedule did not permit accomplishment of this task.

Getting Information For The Files

To obtain the information for the resource files, the unit has several options. First, as previously mentioned, the WRSK kit file could come from either the major command of the unit or from AFLC in coordination with the major command. This approach could give AFLC more play in the exercise since they can adjust the WRSK to cause usage of certain key parts. It permits all the like participants running on versions of the same kit, but with some unit specific inputs. These unique inputs and the random nature of the model will cause parts play to be different for each unit. The MAJCOMs or AFLC can add their high priority items to the list if they so desire or use the MSEL format to get additional attention to a few items. The unit will also benefit from the process, by actually getting to make requisitions against their kit which could then flow through the logistics system.

The maintenance analysis shop at most units would have the fuel consumption factors for the aircraft and the numbers of load crews. With the wide variety of maintenance concepts and the ranges of specialties within the maintenance organization, actual numbers of repair crews will be difficult to ascertain. The base fuels office can obtain the information on the storage capacity of the tanks on base or what is currently in them. If not, the plans shop or the MAJCOM

should be able to provide that information. As a last resort, the host unit at the deployed site could provide the information. The plans shop should be able to obtain munitions information at the forward location.

Summary

The computer was built as a tool to help humans. The simulation model developed for response cells was developed with the same thought in mind. It is a tool to make CPXs more realistic by using time, statistical distributions, and resource inputs peculiar to the location and to the type of aircraft. The model addresses the key elements to sortie production and goes beyond the normal exercise considerations of only fuels and munitions. Spares, attrition, and timing considerations are examined within the simulation. The model was specifically designed so the user would have little trouble with it and would not need an extensive background in computers to operate it. It is self contained in that no additional software is required to operate it and the unit does not have to own or even be able to use the simulation software used to develop the model. With the right information in the files, this model can provide an additional measure of realism to CPXs.

VI. CONCLUSIONS AND RECOMMENDATIONS

General

The purpose of this research was to examine the process for USAF command post exercises and to determine whether or not there is sufficient logistics realism in those exercises. Another objective of the research was to examine the feasibility of using a computer simulation to provide additional realism to the exercises.

The methodologies selected for this research were necessary to fully explore the two main objectives. The literature review and historical research in the Air University archives provided the research background for the problem. The interviews confirmed many of the concerns identified through the literature review and highlighted other problems not previously considered. Actual experience by the author in the United Kingdom at a response cell during Wintex-Cimex 89 also confirmed much of what was believed to still be the truth about the process of command post exercises.

Conclusions

The conclusions presented in this chapter may reflect the author's bias to some degree, although based on the research. By the process of filtration of the interviews, the researcher chose what he believed to be the key comments for incorporation into the conclusions. Other researchers

may have arrived at somewhat different conclusions, based on their backgrounds and personal biases.

Logistics Realism. Based on the comments gathered from the respondents, the answer to the first objective of determining whether there is sufficient logistics realism is that there is not enough of it in the command post exercises. An overwhelming majority of the responses placed the level of realism below the middle rating of "somewhat realistic." The literature also identified this same problem, as have higher headquarters' staffs.

The need for logistic realism has been identified for many years. Leaders present and past have consistently held that we must practice for war as we intend to fight a war. This must include logistics. As mentioned in various parts of this research, the purpose of logistics is to support operations to meet the strategic and tactical objectives. However, as was also noted, in order to have strategic and tactical goals which have credibility, the logistics considerations must have been thoroughly examined. If they were not, then there is no real strategic goal. Without the manpower, mission ready aircraft, and munitions the goal of operations can not be achieved.

Test Plans. The purpose of a command post exercise is to test plans, procedures, communications, and personnel. Since the exercise is only a simulation with forces being exercised only on paper, then there is a requirement to be as

accurate a possible when attempting to mirror the real world in the testing of procedures. This is the only taste some personnel will have of what it is like to "practice war", and we owe it to them to provide the best look at it we can deliver. The USAF combat experience base is decreasing at a rapid rate. The US can ill afford to let the opportunity escape to test, as realistically as possible, the methods it plans to use in wartime.

Training. There were some comments from the respondents and in the literature that CPXs are not for training. If the purpose is to practice plans, procedures, and the like, then what is that if not training? If it is done improperly, then the training the decision makers and their wartime staffs are getting is training for failure.

It is very true, and the interviews agreed with this, that some positive training is gained from every exercise. Even poor exercises can prepare personnel for tasks which they will face in time of crises. Just being on a staff at a response cell or in a regional logistics readiness center for twelve-hour shifts prepares personnel for some of the fog and friction of war. The purpose of a two week CPX is more than an exercise of fatigue. The purpose is to know how the process works, who to talk to about what problems, what the logistics constraints and limiting factors are at the deployed location, how the operations and logistics personnel should interface, what limits the sortie production at the

base, and a myriad of other like considerations. The operations personnel should be teaching a basic understanding of aircraft operations to the logistics personnel. The logistics staff should in turn be supplying the operations staff with the understanding of what it takes to realistically produce sorties.

Improve CPXs. As suggested in the literature and by the interviews, there are methods to improve CPXs. Senior level involvement, not lip service, is a key element to getting more realism in exercises. Words are meaningless if there is no action behind them. The chairs on the battle staffs and response cells should be filled with those people designated to fill them, not a substitute. Senior level involvement from the beginning of the planning process can ensure a better plan.

The data base used for the CPX should be realistic and not filled with simulations. Inputs for the units should be accurate. In addition, the unit should be trained on its role in the exercise.

Extending the time or conducting a more intensive logistics exercise were also options discussed in this research as potential methods to improve realism. Time is an important logistics consideration and the short duration of the CPX as it currently exists, makes it impossible to play many of the logistics issues, such as transportation timing.

Finally, there were comments regarding the potential use of computer simulations or wargames in CPXs.

Simulation. The simulation model built as part of this research shows some merit for response cell play during a command post exercise. The War Readiness Spares Kit portion of the simulation mirrors to a great extent that which was found during Coronet Warrior. The attrition, fuels, and munitions portions of the simulation behave as expected. Whether or not the simulation is useful during a CPX, remains to be shown.

Recommendations

The first recommendation is to test the simulation during an actual CPX at one or two response cells and compare the results with those at other cells. This is the only method to truly prove the simulation adds to realism during a CPX.

The second recommendation is to work towards incorporating more logistics functions in the command post exercise. This would include extending the duration of the exercise to provide additional time to play logistics issues like transportation. With over 75 exercises each year of various types and for various purposes, some of those could possibly be combined into a longer exercise. The USAF may want to consider conducting a "logistics only" exercise with outside help from the operations and intelligence communities. The exercise could begin somewhere well before deployment and

follow through until resupply. This could even be broken down into two separate exercises of which the last one feeds from the first as a logical continuation.

A third recommendation is to develop the data bases for each of the weapon systems more fully for use with the simulation model. The model for this research was generic, a plain vanilla aircraft, although several parameters and the WRSK were F-16 peculiar. By modeling a generic aircraft, the parameters for the various statistical distributions are not aircraft peculiar as they are in fact for different weapon systems. As an example, the turn times for a B-52 are greater on the average than those of an F-16. In future versions of the model, it should be modified so those parameters can be changed in addition to the current user specified variables.

A fourth recommendation is to look at combining a wargame lead-in scenario with a command post exercise. Since wargames are designed to validate decision making and CPXs are designed to test procedures, this would appear to be a good marriage of two concepts. It would supply the feedback which the decision makers need to become more effective wartime commanders.

Some specific recommendations for the simulation model from individuals who tested the program would include making all parameters user inputs, such as probability of aborts, mean times to accomplish maintenance actions, and fuel

servicing times. It would also be beneficial to have the aircraft capable of carrying more than one type of munition during the simulation. In a like manner, the munitions data base should be expanded to accommodate four munition types. On-screen totals for all files could also make this a better product and more useful to the response cells. Currently, only fuel and aircraft are displayed in running totals. There are other modifications which could be accomplished, but those mentioned should be done at the earliest time.

Follow-on Research

Follow-on research suggestions include making the necessary changes to the simulation program and developing data bases for other aircraft types. Additionally, expanding the simulation model for use at a headquarters could be a plus for the Air Force.

Summary

The research is clear on the issue of logistics realism. More realism is needed to improve the logistics readiness of the USAF. Although the command post exercises serve a useful purpose by providing training on procedures, communications, plans, etc, they do not go far enough toward establishing a solid logistics exercise upon which the decision makers, their staffs', and the response cells can operate. Having the wrong people sitting in the chairs during a battle staff operation, the over-simplification of logistics inputs, and

failing to follow through on logistics limiting factors surfaced in CPXs undermines the purpose of an exercise. Logistics and operations must come together to work for the common good, but in that process, logistics must be given a good look. History repeats itself, and if the lessons of past battles continue to be ignored, that logistics is an integral part of the battle, then it will repeat itself again. Realism can not be over emphasized--we must practice as we intend to fight.

APPENDIX A: REALISM IN EXERCISES--INTERVIEW QUESTIONS

Name of Interviewee:

1. What are your experiences in USAF exercises?

   a. What was the exercise name(s)?

   b. When was the exercise(s)?

   c. What was your organizational level (i.e. response cell, battle staff, exercise planner)?

   d. What was your rank and AFSC?

   e. What job did you hold during the exercise?

2. In your opinion and on the following scale, do we meet the objectives of the exercise? Why or why not?

Fail to Meet			Adequately Meet			Always Meet
1	2	3	4	5	6	7

3. Do you think logistics matters receive sufficient attention during exercises? Why or why not?

Not enough Attention			Sufficient Attention			Too much Attention
1	2	3	4	5	6	7

4. In your experience, to what extent are logistics inputs considered when tasking sorties during a CPX?

Not Considered			Adequately Considered			Over Considered
1	2	3	4	5	6	7

5. How realistic do you think Command Post Exercises are? Why?

Not Realistic			Somewhat Realistic			Very Realistic
1	2	3	4	5	6	7

6. In your opinion, did the CPX provide useful training for you or those with whom you worked? If not, why not and if so how much training and of what type?

No Training			Adequate Training			Very good Training
1	2	3	4	5	6	7

7. What do you see as the benefits of a CPX?

8. What are the major impediments to better logistics play in a CPX and how would you suggest overcoming them?

9. Do you have any suggestions to improve realism during a CPX? If so, elaborate.

10. Do you have any other comments you would like to add regarding CPXs or realism in exercises?

APPENDIX B: INTERVIEW QUESTION RESPONSES

Question 2

1. (3) We don't have the right players involved in CPXs. It is hard to get people outside the logistics community interested in CPX exercises and logistics participation depends on the strength of the LG himself. Many of the objectives of the CPXs were met.

2. (4) An effort is made to meet the objectives. The exercise program is fiscally constrained which limits the ability to obtain the objectives. Communication problems hinder our objectives somewhat.

3. (3) One of the problems is that the mid-level personnel want to present a picture to the higher ups (unrealistic) of how things would go and what needs to be monitored, not necessarily what is and what is being done.

4. (6) The objective is to train general officers in exercise battle staff, so yes we meet the goals.

5. (5) There is not enough preparation made ahead of time by the units or the staffs. In most cases the units are not playing, so the higher headquarters and battle staffs can't call them up to get status. Therefore the command level must make up status for the base and for the aircraft.

6. (3) Some personnel play better than others. It seems that the closer to the theater, the better play by all parties.

7. (4) The objectives are for training people and exercising the system, not that the training couldn't be better, but the players do get some.

8. (4) Command post exercises are constrained from a dollar perspective and exercises are too generic. Issues which need to be worked do not necessarily get the attention they need. We are able to do some of the objectives which really need to be seen in the 10 day CPX.

9. (3) We meet some of the objectives but the battle staff should be there. By not having them present it takes the realism out of it. Some people that should be there learning aren't there, and that has a negative impact on junior officers. We need to have the higher ups involved.

10. (5) It depends on the exercise regarding the degree to which we achieve the objectives. We have improved in

specifying objectives, improved the development of the plan, MSELs, and the coordination between the commands.

11. (1) We do not meet the published objectives. We take credit for objective success if we meet it only once. The fallacy that the logistics support will be there when we need it is just that. Some assets we plan for are not present nor are there provisions made to handle them if they were available, We don't look at how to feed, house, or take care of our people. We need to look at things beyond procedures and see if we can do them too. We should play to the maximum extent possible. People learn from the exercise so should play it the best we can, if not we can get a false picture one way or the other. This type of thinking lulled the operations people into a false sense of what logistics can support. We make out critiques which are lies and which make the exercise out to be a success. There is no one willing to be the fall guy for the general to tell them that we have serious troubles in this area or that one. During a CPX, there are people making serious decisions regarding our forces, but there is no feedback mechanism which tells the decision maker whether the decision was a good one or not. Those decisions could be good ones or bad, but regardless, we could get people killed and the decision maker needs to know that.

12. (5) There are many constraints of a CPX which means we must simulate and therefore it detracts from the realism of the CPX.

13. (4) Most of our exercises are not played for logistics but for procedural and operations considerations. We meet the command and control as well as the procedural objectives.

14. (4) Some objectives we meet; some we don't meet. We meet staff interplay to achieve a common solution to a problem. Our communication is poor for the logistics network (at best). We use an artificial logistics data base, and never energize the total logistics system. That means the play doesn't get to AFLC or to the depot levels.

15. (5) Very often the units do not play and depending on the exercise other agencies may not play either. Without the Numbered Air Forces and base level playing, it is difficult to get meaningful inputs.

16. (6) We do not provide sufficient feedback in the after action reports to make it better.

17. (5) Many things provide a potential for failure for meeting the objectives, especially communications, but overall we succeed in meeting the objectives.

18. (5) We meet the objectives, but how we build the objectives in the first place is the issue. We build our objectives so we can meet them, as opposed to testing real problems and trying to resolve them.

19. (5) Some objectives are just not obtainable, such as those with political implications. When implement a TPFDD for an exercise, we may not get the actual unit who is tasked under that plan. The scenario starts cold, but hopefully every one has read the plan which rarely happens. In the real world there is a news build up and events to prepare all the players.

20. (5) We meet some of the objectives but it is a complicated process to get scenario to do what we want it to do, such as getting JDS to do what we want it to do. We are still a long ways from getting all the things mentioned in that article (Lt Col Hoover's article in 1984) resolved.

21. (5) We meet many of the objectives but we leave the exercise and still have after action items which are unknown to the participants. We should hash them out before the participants go home.

22. (5) Generally, we meet most of the objectives, but don't meet all of them.

23. (5) We met most of the objectives this last time. Communications were good and it was a learning experience.

24. (4) We do not always play with the realism as we do in a real contingency. We provide a lot of lip service to meeting objectives and meeting realism.

25. (4) We meet some of the objectives but they are broad in design and specific attention (MSEL activity) must be given to examine one or several aspects of a certain policy, procedure, or established (not established) ways of doing some logistics function. In a CPX, the best laid plans are only as strong as the exercise participants are willing to take them. There are routinely 60 - 75 quality MSELs written for each exercise and the remaining 200 - 400 are questionable. Exercise controllers and battle staff members have the capability to answer the mail or take a scenario or concept one or two steps further to see what occurs. This type of thinking is what produces the good activity and as a result, substantial message traffic, etc to review post exercise and consolidate and analyze. This type of response involves all the commands and AFLC working together.

26. (3) We meet some of the objectives, but are they the objectives we really want? I think we have made our objectives a self-fulfilling prophesy and our objectives are too broad in scope. I have set in on the JCS Explan conferences and debated objectives but it seemed they were pretty much in concrete before the conference began. Another problem is we need to satisfy so many customers--Army, Navy, Air Force, and the various components thereof. This breeds easy to meet goals. We need to be more specific, if not at the JCS level, then certainly at the MAJCOM level. We also need to design our MSELs to test those objectives and stress the system. We might even want to try something novel like letting the system fall on its face.

27. (3) Rated low primarily because of the way we build exercises. The events are written prior to the establishment of the objectives of the exercise. The exercise is built before the exercise objectives are set. Very few people really understand the purpose of a CPX which also causes problems. Still fewer people understand how to write obj tives. A CPX cannot accomplish everything, but the list of objectives is so long that it encompasses a year or two worth of action in a 10-day exercise, which is impossible. A lot of people think a CPX is designed to test the accuracy of stocks and things like that which cannot be done in a CPX. We do not do a good job of articulating them in the first place and that is one reason the objectives are not accomplished at the end. A CPX is procedural and designed to test decision makers on procedures, plans, programs, and to a degree, communications. If we took into account everything in a realistic way, it would take days or longer to do some of the actions.

31. (4) Some exercises do not lend themselves to achieving the objectives.

Question 3

1. (5) We perform a testing of procedures, not necessarily logistics, but as long as we record when we ran out of the asset and how to correct it we can have logistics play. We are not playing for the unit or the command (USAFE); we are playing for national goals. We achieve many of the logistics goals. In the major CPXs, we don't really play logistics because there is too little time and too many constraints to adequately play logistics properly.

2. (3) We tend to consider that the mission will be accomplished regardless and if logistics constraints are considered, it is to give the loggie something to do. Few

people have a realization of just how constraining logistics can be.

3. (2) The flying operations and scenario are built to flying and funding requirements and the logistics community puts pitfalls into the scenario which cannot be overcome in the time of the exercise.

4. (3) The time frame of the exercise does not allow for good logistics play (10 days) to start. As a result, we cannot play every logistic action in the right time sequence.

5. (5) Logistics considerations receive sufficient attention in that they were handled, but if accomplished the logistics action on time, it received little attention.

6. (3) There is some logistics consideration stateside, but in USAFE, it is a top priority. There is really very little to do on the battle staff shift stateside.

7. (2) Depending on the exercise and what is currently hot, the attention of logistics may be different. There is a lack of logisticians; just giving an AFSC to a person does not make them a loggie. For most exercises, logistics is hard to do and dollars and time are scarce.

8. (2) Logistics are considered but a lot of things are not addressed, such as apportionment of engines. Some exercises are not designed to test logistics and generally there isn't enough time and money to sufficiently test logistics. Too, we do nit noid things during CPXs which we normally would not do, like building briefings with deluxe slides. Additionally, we don't always have the right players present on the staffs.

9. (2) We need a CPX for the loggies. Operations are why we are here, but if there was a logistics exercise then we wouldn't have to worry about stopping the war due to logistics time and shortfall considerations. There is a lot of magic during our CPXs. We haven't proven that our tank build up is sufficient and do we have enough work-a-rounds to accomplish the mission. We hear during CPXs, "Don't worry about it because the war will be over before then" or the like. We use plans which have not been approved as of the exercise. We exercise to death and haven't even answered the mail from the last one. We spend all the time just planning for the next exercise rather than trying to fix the problems from the previous one. Perhaps one exercise per year for just loggies would allow us to answer some of the tough questions.

10. (6) Regional exercises do a better job of handling logistics considerations; the global ones are not as good at logistics attention but they are improving.

11. (1) Most exercises do not consider logistics. Merely requisitioning a part is not playing logistics. Logistics is played, but not really considered. It is basically a joke.

12. (4) The Air Force is a supporting command during most exercises so logistics falls to the supported command (service).

17. (4) We do not stress logistics at all. Once a logistics action begins to impact the exercise, it is terminated. We need to go beyond and look at what it takes to get it there.

18. (5) Logistics receives a lot of attention, however the way we script out the exercise, we assume away certain things we should have been measuring in the first place.

19. (4) The logistics MSELs which are generated are some of the better ones as are their objectives.

20. (4) Logistics gets the attention, but do we focus on the right things is another question.

21. (3) Logistics not asked about logistics support when have to relocate from one area to the next. Generally, logistics support is not considered.

22. (3) While logistics is a driving factor in most exercises, we don't play the game right to get the information we need.

23. (3) In the exercise the response cell had some problems with the sponsor unit picking up many of the responsibilities initially from the response cell. Then, the transition between the two was not always smooth. There is also a lag time in resolving problems or mistakes with the scenario.

24. (6) Logistics receives good attention because it plays a large role in sending out the forces.

25. (3) We rely on individual areas (maintenance, supply, contracting, etc) to provide areas of emphasis, since our office does not have knowledge of all logistic facets. The operators "script" away much of the time consuming logistics support functions. "It will be there" is not always a good answer. There is some reluctance to break away from pulling previous Explans from the safe, changing the name, and proceeding. There is a lack of interest in exercising a new

initiative. We have been successful in working with MAC and SAC to exercise logistics support from AFLC to them. This works well, unfortunately a lot of logistics processes are scripted away (exercise artificialities).

26. (3) In most of the exercises I have played in, the logistics concerns were an after thought unless some brave loggie opened his mouth and spoke up. Often then, he was told thank you and to sit down. Rarely were logistics considered, although when the operations side made a move without coordination with the logistics side, often logistics were given great attention, either from the "you can't get there from here" approach or from the "well, what will it take to support that move" approach. Fortunately during real world crisis actions, the operations and logistics sides communicated much better, but that was due in large part to the same players day in and day out.

27. (2) Logistics matters do not receive enough attention because logisticians have not got our arms around what it takes to realistically reflect logistics in a CPX. You cannot have total realism because it will not fit. We talk logistics, but we do not really in any meaningful way temper logistics realism to fit it into a CPX. We as logisticians have not done a good job of that trying to solve that dilemma, although there are efforts underway. We do not do a good job of setting up a CPX like the intelligence people do. Logisticians do not generally do that. We do not know the ramifications of certain of our actions, such as changing DEFCONs and what results with it. We need to do a better job of fleshing these things out to and making the CPX a good education for people.

28. (3) Logistics is not considered due in large part to communications problems.

32. (3) Wing level does not play and since many of the responses would come from the unit, logistics does not get enough attention.

33. (3) Logisticians are not strong enough planners and lack the support from the operations staff.

Question 4

1. (1) Logistics are not considered at all.

7. (1) Logistics was given zero consideration, due to command and control problems. The tasking comes from higher up and it is at the unit level where we adequately assess what is logistically feasible or not. Additionally, we can

not convince the operations side of what we are talking about. We, as logisticians can't prove it isn't realistic.

8. (3) Logistics tasking for sorties is not an issue at AFLC, but the sortie rates during a CPX are not that difficult to attain.

9. (3) It really depends on who's playing as to how well the logistics is considered. We don't play the MSELs correctly when we say a building is destroyed, but we do not perform any detailing of the level and type of damage.

10. (5) Logistics inputs are considered more in a theater level exercise than in a global level or SAC perspective. Unless there is a specific MSEL which is driving it, there is a tendency for the CONUS forces to not pay attention to logistics impacts.

11. (2) We are lulled into believing that downtime for aircraft is short and need to be more realistic on how we calculate it. Randomness does not affect downtime and there are a lot of considerations which must go into downtime calculations. The use of a historical data base made the situation similar to what would be expected if aircraft were on the ramp. Not enough questions get asked normally, but the historical data base stirred questions from both the operations and logistics staffs on the response cell.

12. (3) The quality of inputs and timing of inputs is sometimes too late for tasking and the types of logistics inputs are limited (i.e. fuel and munitions). Sometimes the logistics inputs actually result in a decreased sortie tasking if they are considered.

13. (4) The logistics side can get operations side to pay attention when fuels and munitions are low.

14. (2) Logistics are considered, but they do not make a difference in sortie generation. To make the war go on during the CPX, they are not considered. The operations personnel do not use the random number generator for calculation of their sorties.

15. (5) We do take POL and munitions into consideration, but rarely get into spare parts. We should use WSMIS more during our CPXs.

16. (2) We need to educate our operations personnel on exactly how we get things done. It will benefit us all.

17. (2) Logistics is considered but not greatly. We have the operation folks on one side of the fence, maintenance on

the other, supply on yet another. We just can't seem to get everyone talking on the same sheet of music. The logistics people are sometimes the last to know what is going on. There needs to be logistics advice early on in tasking and planning these exercises.

18. (3) Spares are not scripted; fuels and munitions are looked at. They are the only limiting factors during the exercises. There is no synergistic effect from one incident to the next since parts are not played. We do not look at how one action in maintenance can affect numerous others in supply. We do not allow the game to play as it would in reality.

20. (5) For political reasons, there is a great tendency to bow to the logistics limitation pressure. We have made improvements however. I have not seen an aircraft change configuration in route to target in recent exercises. That, or events like it, used to happen often.

21. (5) We need to have better trained Advon personnel. The reason for the Advons is to fly sorties, but many of them do not consider some of the logistics inputs. It does not detract from the exercise, because we can play it anyway, but we must identify it and address it in the after action reports.

22. (6) Logistics gets consideration. In Europe, the operations belong to NATO and they constantly ask what we have at different locations. In fact, we cancelled missions due to lack of munitions.

23. (6) Coordination was generally good regarding logistics inputs considered for tasking, but more host base support is needed to actually calculate these logistics concerns.

24. (3) Logistics concerns are voiced, but it is an operations call that says what we are going to fly.

25. (2) MSEL activity does look at WRSK levels and the amount of forces deployed in a particular theater.

26. (3) In tasking sorties much as in the exercise itself, logistics takes a back seat. The real status of aircraft enroute is rarely considered even when JDS was used in the flow. Spares are "too hard to do"; munitions are played but magically generated and moved; fuel is looked at and resupply is at the drop of the JP-4; time to repair, time to turn, time to load, time to etc are never considered. Transportation issues rarely surface, again, because they are too hard to do.

27. (4) The extent to which logistics is considered is totally dependent on the people involved. There can be a total involvement between operations and logistics, but the reverse is also true. If the people will work together, there can be a good interplay and a lot of consideration given to logistics.

28. (5) Logistics are considered, but the logistics we use are not realistic.

29. (1) Logistics are considered when tasking but they are done as an after thought, not as a combined, well thought out course of action.

Question 5

1. (6) Our exercises are realistic for what they are designed for, but they are not realistic to test operational concerns and issues.

2. (4) CPXs try to be real, but too many physical things are assumed away with a stroke of a pen. It takes a long time to actually move things such as a WRSK. The human element is also assumed away.

3. (3) We are trying to put realism into the scenario, operations want it as does everyone else. A big problem is that there is no opponent so there is no second guessing. It is the same thought process on both sides since the same people are playing the exercise on both sides of the issue.

4. (4) Two things really detract from the realism. Time compression takes away from the realism because there is not enough time to simulate all facets of the war. The other issue is there is no enemy to react to the events.

5. (3) Our units don't play so headquarters fabricates things. We simulate movement and that nearly all things were accomplished on time with a few exceptions sent in via the MSELs.

6. (6) Overseas and at deployed units the exercises are very realistic. At a headquarters level, we need more involvement with lateral commands.

7. (3) We lose realism because there is no intelligence on the other side who is trying to counter our movements or decisions. Another aspect which detracts from the realism issue is that there is too much emphasis on making viewgraphs for the CINC.

8. (3) Most CPXs are a very broad brush approach, so the realism level is lower. Communications also lessen the realism. Since the CPX is artificial, we find ourselves doing things which shouldn't be done such as big briefings. It also depends on the emphasis of the commander, but too often it becomes a paper shuffling drill. These exercises are a good forum to test our procedures.

9. (2) Overall our exercises are not realistic. We do not stick to the scenario, nor do we interject realistic events for fear of tipping the boat over.

10. (4) The CPXs give us a sense of the stress, communications problems, and backlogs, as well as difficulties in making decisions under these conditions with these problems. It provides a sense of the "fog of war", and shows us that some things we do day-to-day are not applicable in time of crisis.

11. (1) Our exercises are not realistic at all. We have simulated the environment, and we need to consider logistics as a co-equal with tactics. We should not simulate to the point that everything is artificial, that would be a wargame. The potential is there to make this a realistic (logistic) exercise. Logistics is central to the whole thing. If we play logistics properly, we will automatically play operations. We have a responsibility to get the realism to the level where the operations and logistics talk together to get to the work-a-rounds. We can't put bombs on target in the real world without the logistics to get it there. We should ask no less in a CPX.

12. (3) Our CPXs are not very realistic. We do a lot of simulating at the response cell level. The response cells also use the CPX to train new people and therefore we do not always get good inputs from response cells. At the higher levels, it is too easy to simulate the events.

13. (4) There is some realism to working the issues if the events are planned correctly. We need more intensity and volume during the exercise to mirror the real world. We don't actually requisition items and we don't have capability currently via a computer so we lose realism there.

14. (4) Our exercise are realistic based on communications with allied nations and operations, but not on logistics issues. From an operations point of view, it is more realistic.

15. (4) Our exercises test the upper echelon decision making level (semi test), however the real battle takes place

at base level and in most exercises the base is not playing. We lose realism without our units participating.

16. (5) Our exercises play a large part of operations issues, but budget cuts take from the logistics portion of the exercise.
We get good realism from the paperwork end of it. We could be more realistic if we would do some real world tasking in conjunction with the CPX. The taskings could come from the local area and give the response cells some actual work.

18. (4) Again, we don't consider the synergistic effect which one event has on another. It is not realistic how we do sorties or how we consume. We lose realism due to time compression.

19. (5) The exercises are somewhat realistic, but there are many artificialities in the design process. We can not nuke New York, it would be politically unsound. The same goes for other countries. We do a good job of pre-scripting events.

20. (5) We must crank in some artificialities because it is a CPX.

21. (6) The exercises try to be as realistic as they can. Any training scenario is artificial.

22. (7) The intelligence build up is good; attrition rates are believable; and incidents at the bases are realistic to what we expect the enemy might do to our bases, so yes they are very realistic.

23. (5) Our sponsor unit used a different starting data base than the response cell used, which created a good deal of problems for us and lessens the realism. The response cell tried to use actual base particular levels for the taskings and such.

24. (5) We will win the war regardless of the decisions made or the logistics shortfalls is a predominant attitude. We give only lip service to realism and do not attack the real war problems from a logistics perspective. The senior staff does not play and in real world (we hope) they will be active in the battle staffs and response cells.

25. (5) At JCS level, the realism is high. At 7th Air Force, SAC, and MAC, the realism is probably pretty close to real activities, but getting into the support commands you are getting shaky. CPXs are designed to test procedures and new concepts. They are only as effective as the planners wish to create them. This is a difficult task to plan detailed activity and many of the functional folks assigned

as controllers/project officers do this as an additional duty. 85% of the time it is 50% - 50% for real and fantasy land. The remaining 15% is about 90% real world. I have heard the joint CPX/FTXs are good, like Global Shield and Ulchi Focus Lens. When all the services, SOAs, and DRUs, are involved, you run the risk of simulating too many things. Simulation is okay if done correctly, but too often lack of knowledge by a handful simulates incorrectly and the credibility of the exercise goes out the window.

26. (3) These detract from the realism of the exercise. The operations portion is realistic from the flying phase or perhaps even conservative as far as attrition and availability goes. The intelligence is usually quite good. Logistics stinks. The planning for logistics inputs and the time required to actually accomplish the actions remove them from play. Too few planners will take the time to research actions. Too many planners are still working on the last exercise and too busy to make the necessary preparations for the current one. We are not allowed to use our expertise to generate real play from the response cell locations based upon what that location actually has available or would have available based on TPFDD flow.

27. (5) The CPX is the only way to tie all the functional areas together to be able to test a plan. We do not do well in getting logistics realism into the CPX. Many times the people that play the exercises are not the people who will be playing in the real world. The jobs are relegated to people who are available to do it, rather than the ones who we would expect to do it in a war. The CPX loses a lot of its potential benefit by having it happen in this way.

28. (2) Our CPXs are not realistic at the response cell level. Our communications was poor and the Startex data was not accurate.

31. (4) The real world participants do not participate because they are busy doing the day-to-day things. Realism suffers as a result.

32. (3) The intensity is not there because bombs and bullets are not flying.

33. (2) Solutions to problems were very unrealistic. It takes an act of God to break the flow once it begins.

Question 6

1. (6) The biggest problem is a lack of training on what and who to do it to. We know how to use USAF systems, but

not the ones we will use in a war such as those in USAFE. The exercises do provide useful training for the higher levels, but zero for base level. The bases are the workers and they send the MSELs. There is not much training in that. The base level operates the way they always do. The CPX offers good training for the decision makers.

2. (5) Any exercise, if you realize the shortcomings, provides useful training and lets you understand what should be done. If a problem comes up we need to identify it and then we can correct it during the next exercise. The CPX does tend to concentrate on the paperwork involved instead of the people side.

3. (4) The CPXs were a good experience, but we did not have the correct or accurate information. The exercise provided a good showcase for dealing with people and finding out who does what to whom.

4. (5) It acquaints the people with wartime reporting and procedures, documents, etc. It trains the players to operate the facility which they will be in during wartime. It also stresses the players physically with 12-hour shifts.

5. (6) The CPXs are unrealistic, but still they provide training--just sitting there and attempting to find answers to questions and learning who to talk to about what provides some level of training.

6. (3) In Europe, you either sank or swam and learned a lot. The response cells were always involved. In the states, most players only sit through one or two shifts so they don't get much training from the exercise.

7. (5) The amount of training depends on the individual. Generally, the new folks get the most (i.e. those in their first through third exercise).

8. (2) The exercises were not terribly strenuous. It seems that there was more concentration on building briefings and integrating the efforts of others. We did not work the "real" logistics issues. I do not believe that we were necessarily doing what we would do during a real world crisis.

9. (5) The CPX provided a lot of experience because of the rank which most of the players worked at would be the rank that the "big boys" would normally participate at. We get exposure to things would not normally see. It is good for junior officers, but the Colonels might be getting ripped off by a lack of training.

10. (4) There was usually good training during the major exercises especially integration training within the staff (assuming we could take advantage of it). There is usually better training at the junior level because they are less experienced.

11. (2) There is an exposure to the scenario and to the criticality of the need. Those in themselves show some level of training. Just being exposed to an FOL is training.

12. (5) The command and control training is good. It is the only time we exercise logistics communications of upward reporting and downward taskings. It also gives the logistics disciplines a chance to come together.

13. (5) The CPX confronts the various functions and decision makers with the types of problems they could see and forces them to go through the decision making process. They do not exercise the logistics systems, but rather exercise the people side. We may need something separate and apart from the JCS exercise to fully play the logistics spectrum.

14. (4) For the people that came in from the states, the CPX gave them an idea of their wartime locations and the reports and types of communications they could expect to see. It gives them an idea of what to expect. The younger the logistician, the more experienced which is gained.

15. (6) I received good training on JDS, WWMICS, and the other computer systems. It provides some, but not the same level of stress. Munitions and POL got a good wring out of how to move things in war time, but the other logistics areas probably received less training. For supply, there are no issues, no requests, and only a couple critical items are played.

16. (7) It provided a means for good interface with operations. It also shows the communications side fairly well with the stresses on the system and the backlogs in communications. It also gets people looking into the plans and talking about scenarios. It makes people aware of what could happen, regardless of how the exercise goes.

17. (6) It's getting better.

18. (4) The training is useful depending on the individual involved. There is very little preparation on the part of most individuals, in fact, many had no idea of what their wartime duties involved.

19. (6) The lower levels are less satisfied with what is happening based somewhat on the level of activity which they

are seeing. We need to write good MSEL events to drive play for the lower echelons.

20. (5) The exercises provide useful training, but improvements can be made. You get what you want from it. If you want to just get by, that can happen. If you want to really get in and play it realistically, that can happen too. We just don't have the senior level attention to what is being planned for the exercise from the get go. Instead, they get interested about two weeks before the exercise. We need the ground work laid early and therefore, we need that senior level support.

21. (6) The CPX provides good training. No longer will the response cells walk into a position cold. Usually there is a 60-40 spread between those who have done it and those who haven't, with the 60 being those who had done it before. This last time (Wintex-Cimex) it was the other way around.

22. (6) In the NATO command posts we get some good training, however in the US command posts, we received very little. NATO bunkers have the leadership in the bunkers; the US command posts usually show up with the "big guy's" third or fourth alternate. The emphasis is just not there.

23. (7) We received good training, especially on reporting procedures. We had on-hand experience, learned the United Kingdom reporting system, looked at the base operations, and how the host unit will help. It gave us that important opportunity to visit the FOL.

24. (7) I have always learned a lot, but I keep seeing the same lessons learned from exercise to exercise.

25. (2) Many participants do not read the plan until they come on duty for the exercise even though the plans are available for review months before the exercise. Most individuals who work exercises do not want to be there and this has a direct relationship to their level of effort and activity.

26. (5) If you don't learn something, then you just didn't put out any effort. However, more could be learned if the response cells and battle staffs had some feedback loop. More could also be learned if the response cells could be manned at a higher level and allowed to really work the issues.

27. (4) A CPX does not provide anybody training; it provides the opportunity for training. We have not built a structure for the CPX that encourages people to get into it and "muck around" with it. It is all artificial, so you

cannot wait for something to happen. It is up to the individual to do self training. If they did not get anything out of it, it was their own fault. Some people do not even know who their counterparts are at the higher headquarters or even the phone number, because they have not taken the initiative to learn.

28. (5) We received training, but at a cost. We were exposed to reports and a high frustration level. The planners should put out the information to response cells and let them know why they are playing and exactly where their role is in the big picture. The work schedule needs more people on it from other AFSCs.

29. (5) The CPX allows the player to function with other agencies and being able to understand what their functions are relative to yours.

30. (4) The right people need to be playing the exercises (i.e. the general officers, colonels, GM-15s, GM-14s, etc). Those are the ones who should be participating and they usually don't.

33. (2) Participants get very little training except on computer use.

Question 7

1. The advantages of the CPX is that it identifies shortfalls within our procedures and gives us the opportunity to practice those procedures. NATO and higher levels get excellent training from the CPXs.

2. They are better than doing nothing at all. They are the next step down from an FTX.

3. The CPX provides some training at a lower cost compared to a real world movement.

4. We can do somethings that can't be done in an FTX, such as chemical attacks. The CPX is also more economical and we get a lot of benefit for a lower cost.

5. The advantages are training and they keep us current since we can't do large scale exercise all the time. They are a valuable training asset.

6. The CPX teaches what would be doing (at the wing level), but at the headquarters level, not as much. They are useful because without them, not everyone would be as well prepared.

7. The main advantages are wringing out command and control systems, establishing communications channels, learning how and where to extract information, and training for the staffs.

8. The CPX provides useful training for the staff, problem solving, prioritizing the needs, and an opportunity to refine procedures to eliminate needless tasks.

9. It gives experience of what we might not normally see. If we work the exercise properly, playing the MSELs to their logical end, it allows the opportunity to see what was actually blown up by going over to the area and seeing what was in that building or near that runway. This allows us the opportunity to think and work on attrition of equipment, requisitioning people, and involving a lot of other things and disciplines. I learn a lot about the little things (fuel, munitions, etc) from each exercise.

10. It affords the opportunity for the staff to see the internal workings under a "wartime" tasking, ensuring that plans and procedures are appropriate and providing the correct guidance. It is the only way to test some of these things.

11. The main advantage would be training the way we fight, but we don't really do it that way. We should use same procedures during a CPX as we would during a war.

12. It lets us practice command and control at the higher headquarters level.

13. The best advantage is getting the different functions to talk to each other and relate to the others job, both within the headquarters and within the chain of command.

14. The advantages of a CPX are it makes people get into the war plans, the TPFDD, and the other planning documents. It makes them ask the questions like what did we flow and what is the timing to get assets there to fly mission. It makes us think war for awhile. We do see some shortfalls during the CPXs which may not have been noticed during the OPlan development and we can modify the plans at the review based in part on our findings from the exercise.

15. The advantage is the communications aspect--communications between MAJCOMs, unified commands, and JCS.

16. Interface with the other functional areas is a tremendous advantage. We get a chance to learn about operations world and other logistics disciplines.

17. The advantage is that the unit gets a nucleus of people into the actual area and they can take information back to their unit and do some planning with it (i.e. Checkered Flag). It allows units to do the wartime reports vice their normal day-to-day paperwork. We get actual hands on experience.

18. CPXs give us an ability to measure and test procedures as they are designed to function. It breaks down when procedures do not work so we can make changes if necessary. We make the objectives so the procedures will work.

19. It allows us to test new procedures and test the war plans.

20. The main advantage is that we can make mistakes without killing anyone. We can also evaluate the deliberate planning process.

22. Cost is an advantage. CPXs provide a definite cost savings. We can test out the plans without moving people and equipment, and therefore save money. They provide worthwhile training at a cheap price, and provide a way to validate the plans (test, validation is the war). The training aspect is mainly at the higher levels.

23. The main advantages were visiting the FOL and working with counterparts at the location battle staff. We identified some problems like some things we thought would work didn't. From that experience, we will now update our base plans to show what really should be done. It also allowed us to look at the size of command post and realize that not as many people can fit in it as we would like. We also has the opportunity to understand the UK procedures.

24. Training is a big benefit. We get to see a plan come together in a fashion. We become familiar with the documents and plans, learn reporting procedures, and get to communicate with the other war time agencies.

25. The benefits are exercising war plans and procedures in a controlled environment; exercising the transition from peacetime to wartime operations; providing an avenue to examine and correct real world problems or deficiencies identified as a result of the exercise (through the remedial action program); allowing the opportunity to have top, mid, and lower decision makers involved in the exercise; and implementing work around procedures or another way of doing things under a crisis situation.

26. The benefits are it allows a test of the war plan (pseudo plan) without getting shot at. It is a no-fault exercis, and a chance to surface the "gotchas" and fix them before someone really gets killed. It allows a modified crisis situation to practice in and hopefully pushes decision makers to make correct decisions. In this time of peace, it allows a glimpse of some of the problems we may actually face in a war. We just can't get that experience through many means short of war.

27. The benefits are to fine tune plans, procedures, interfaces and to think war in a peacetime environment and apply that to the situation at hand. If the situation is really played and the people get into it, there can be some dynamic thinking in terms of wartime support. This can be a stepping off point if it came time to go into a real world situation.

28. It gives us exposure to new things such as reporting systems. It simulates a wartime environment to a degree and allow us to interact with operations. For a guard unit, it gives us an appreciation of why we are in the guard and what to expect when we deploy to our Co-located Operating Base (COB) locations.

30. The benefits include validation of systems, finding weaknesses and fixing them, and training staffers.

Question 8

1. There are more operations inputs and we need more inputs from other functions. We don't play with AFLC stock numbers and we should, rather than being so general.

2. The biggest impediment is ignorance, and the way to overcome it is by experience. People don't realize what it takes to accomplish things logistically. We need to get experienced loggies in the flow, pounding on the operations community and others to let them know exactly what it takes to move those aircraft. It doesn't happen magically.

3. The impediments are the scenario and the experience of the people we have regarding what it takes to do the job of moving and operating the forces in a wartime environment. We should do less frequent exercises, and actually do the movement (i.e. Bullrider). We simply can't wish the constraints away.

4. There is a lack of experience (wartime) of logistics planners today. The LG staff is still involved in day-to-day actions and we get less quality personnel to participate in

the exercise because of that. It is generally someone the 3-letter can afford to give up for 10 days. We should place the importance of the exercise higher on the scale of the general, fill players by position number with no substitutions allowed, and ensure the O-6 is present for duty and don't let him send his O-3 to do the job.

5. One of the impediments is that we can't degrade the readiness of the units, so they can't afford to lose people from the office during shift coverage.

6. The major impediment is the scenario. We should develop a "real" scenario.

7. We need improvement in logistics realism from the top down. The folks at the bottom are too busy with day-to-day problems, so it must become a priority from the top and make it a willful thing to accomplish. We also have a lack of loggies with the knowledge necessary to play the roles on the response cells and battle staffs.

8. There is not much confidence in the Remedial Action Process (RAP). Another one would be the dollar redistribution of how to handle civilian overtime and where do we take the money from. These is also a lack of realism and lack of command direction. We need to get the higher level people playing and driving events. Even a bad exercise can be effective (i.e. Nifty Nugget). We should be more specific in the objectives.

9. Time is big problem. Other problems would be cooperation from the staff and three exercises working simultaneously at some stage of development. Administratively we are bogged down. One or two experts can not do it all. We need people who really know their stuff during the exercise, but the director may not want to let them go. Another problem is that we do not avoid the magic wand syndrome. We get instant resupply and instant fixes to our problems.

10. Time constraints, especially if the exercise runs less than 10 days is one of the biggest impediment. Another would be the perception that we can not play logistics because it will put a stop to the exercise or the operations mentality which says I don't need logistics. The solution is to design MSELs better (lost a C-5, what was on it?), which don't take a long time to fix or can be played without an absolute fix. We must avoid the instant get well. We should continue to get people to understand the importance of logistics.

11. The major impediment is people. We must take the exercise more seriously and play logistics more fully. We must be able to evaluate the decisions rather than just

making a decision and running with it. We should stop doing things for political expediency and stop being untruthful in our after action reports and MSEL items. We need more time to adequately generate the MSEL items and prepare the plan. We need more interface time with the right people. It is essential to the national defense. We owe it to the decision makers to provide them with the best scenario and inputs we can give.

12. In the CPX, nothing moves so it is very easy to simulate something from point a to b. There is too much reporting of the wrong kind of information and each year we play same items over and over. Are these items really the critical items? Why is it that we get by with 3 pieces of equipment in CPX, when it takes 25 in war? We don't practice the transition to war such as host nation support (HNS), and we should. To overcome some of these problems, we could try modelling some of the scenarios, provide training on how to create and conduct a CPX, get more qualified people at the response cells (maintenance, supply, transportation, and civil engineer representatives), play larger cells at one location instead of the smaller cells we currently use, have a large DISTAFF to send the MSEL inputs; or have a computer model to provide help and give guidance on correct numbers of equipment needed to launch force.

13. The big problem is the short duration of exercise and the scenario especially the front end exercises which do not exercise the log systems. The toughest time for the logistics part is in the 20 - 30 day time. The limited time frame is tough for the loggies.

14. We do not have a good logistics data base to play from. We should selectively deploy the combat supply system so we can task and move things in a more realistic manner. If we do it selectively at first (2 or 3 locations) and control it from the logistics response cells, it could add additional realism to the CPX. We need a current data base system. If we just played WRSK kits in real time we could get a better understanding of how it will work in war. Why is it that we come from a totally computerized environment in peacetime and when the exercise draws near we go to a manual mode? That is not realistic.

15. We need base level participation in order to make logistics system work. An alternative to that would be to develop a true data base and have losses and shortfalls worked by the MAJCOMs through AFLC.

16. The biggest problems are the time of the exercise and money to get more people and equipment involved.

17. We need to improve the logistics play for the simulated events through such actions as identifying part numbers (i.e. stock number vice "front main tire"). We should ensure that the missiles which the unit has are the ones tasked, not some other brand which the unit can not use. We must pay more attention to the events in the Military Incidents Listing (MIL).

18. The impediments would be real world sustainability issues and how that impacts the scope of the play and how that impacts on the objectives. Most exercises you could stop as a result of logistics and we should consider those stopping factors. Perhaps a way to overcome those problems would be to make the exercises more interactive like with the wargames.

19. The problems are how much effort is put into the plan and apathy on the part of the participants. We should get higher level attention and activity in the exercise to help counteract the problems.

20. The biggest impediment is a lack of understanding by others of what logistics community does. Many people believe that if it has to do with exercise or war planning, it belongs to LGX rather than supply or maintenance. Planning and participating in the exercise is an additional duty for most folks. Many of the participants are only on shift for one 24-hour shift. That is not good. We are constantly bringing others up to speed so the useful training and experience is lost. This can be overcome by having senior officers involved from the beginning to include scheduling of the battle staffs and response cells.

22. The MAJCOMs do not realize that we can not get the level of involvement from the base level that we desire with the units playing with only a skeleton crew during the CPX, unless we give the units the MIL inputs in time to decide (as a staff) what will happen at their base. They can then prepare a response to be flowed at the correct time during the CPX. This skeleton crew can not act for an entire battle staff and we can't have the entire wing from all the bases playing. This sends the wrong message to the enemy. We also need to cooperate with other services on play such as sending the actual transportation request messages to the Army.

23. There is a need for better planning and coordination on data base. The units need a clean data base that does not have any discrepancies in it. The response cells should get to the location on time, not after the exercise starts. There should be no difference in the reporting procedures from peacetime to war time and those procedures should be standardized between the theaters. The response cells should

be brought up to speed better from the sponsor unit. We should also have the MAJCOMs doing nearly the same thing in terms of logistics support. Currently TAC, MAC, and SAC all do it differently. We should also have the LRC at unit level get all the local logistics functions together and discuss how they should play the various MSELs.

24. The biggest impediment is apathy. We don't send our best people because the "war" is too bothersome. We need to get the senior staff emphasis at the beginning and their involvement (not lip service) during the exercise. This is important.

25. The impediment is the number of stars (general officers) that become involved in the planning and execution phases. Too often the 0-6/0-5, GM-15/GM-14 do not work or sit in on any exercise briefings or work in the battle staff. There seems to be a trickle down effect when personnel do not see a general officer involved in the exercise. This is not all bad however, there should be a cross-section considering the higher levels have a broad knowledge in many areas and specific knowledge in some, while the journeyman level mostly specify in one or two areas. We need that high level involvement. The other impediment is MSEL quality. This goes back to management review and concern for the program. By having management review MSELs, their experiences in that functional area can add a lot to the quality and inter-relationships across various logistical areas. Without this level of effort, many MSELs are poorly written that do not accomplish or test a whole lot. It is an impediment of planning vice execution.

26. The biggest impediment is time. We need more time in an exercise to play logistics more fully. We could use a war game to set the stage or a simulation to show parts usage and time to travel, but we are not there yet. People are another impediment. We need more involvement from the big players on the staffs. They should be in their war time locations as if it were a war and practicing for all it is worth. The people scheduled to deploy by the plan should be sent, not some last minute substitute who wants to go shopping. We should send more of the right players, instead of the handful we send now. We can overcome these by exercising less often but for longer periods, analyzing the information from the last exercise, and spending the dollars to send the correct people.

27. We would like to have something which would generate requirements in order to add dimension to the system. Since there are no aircraft flying and no capability to simulate that currently, there is no demand on the system. We do not do a good job of training the people going into the CPX. We

use it not so much for a training environment, but for an evaluation tool. That is not good. Some people want to put things into a CPX that they know are already a problem, only so they can use it as an advocacy. That only frustrates the players. The players ought to be trained and how to do the work-a-rounds.

28. Communications and reports are problems. There is a high learning curve for most exercises. We are not realistic in closing the loop, for example, how long does it take to fill a requirement.

30. The biggest impediment is that real time support by senior executives is lacking, both on the military and civilian sides.

Question 9

1. We can improve realism with better MSELs. It is not good or realistic to put 75 people in a room which holds 30. We should concentrate on the big things and stay away from the minutia. We can get rid of hardware realism and keep decision realism. We should build a logistics exercise, not a world-wide exercise, but a regional one.

2. A way to improve realism is to get one experienced loggie and one inexperienced loggie on one shift and have them speak out with what about this or that. It can be very valuable and enlightening to the rest of the staff as well as to the inexperienced loggie. We need that during a CPX because things are not actually moved.

3. To improve realism we must educate the staff logistically on what are the log constraints and how it affects the total play of a scenario.

4. We can improve realism by having events which are believable to the response cell and to the staff.

5. If we have everyone play from headquarters USAF down to the unit and have the people be better prepared, our realism would improve. If we put the lessons learned from the previous exercise in an appendix in the Explan, that might also help.

6. We should have the major commands get together and develop joint MSELs prior to the Explan conference. That would improve the interplay between the Air Force commands and de-conflict some of the events.

7. A way to improve realism would be setting up a system to provide response cells and units with a computer aided simulation capability to provide realistic inputs, which portray to the response cell a sense of realism which can be inserted into the system. We should build tools for the bases and provided them to the field units.

8. To improve realism, we need to have more specific objectives, to play the exercise for a longer time, and have commander involvement (directors too), and have the people play who would play during the real thing.

9. We should pull in the experts and allow them to dream up a logistics goal and direction. We should use senior enlisted experience and use realistic rates when we do this. The goal is to find weaknesses, not just to win but to find work-a-rounds. We should read the after action reports and solve the RAP items. In addition we need to allow more time at the beginning and the end of the exercise to work the issues so we won't see the same things cropping up time after time.

10. To improve realism we need greater familiarity of the plans by the folks doing the jobs, good coordination within the planning community, and commander's support.

11. We can improve realism using a historical model. It has more application to the CPX than any other thing used, since it is not equations or code, but actual events. We take reality and make a mirror of real incidents in the historical data base. It is difficult to validate a synthetic model, but the historical data has already taken into account the real world influences. All other data bases are based on peacetime data which is an invalid predictor of wartime requirements.

12. We can improve the realism with better MIL development and by taking a more top down approach.

13. If we make our exercises longer we could improve on the realism issue. We could develop a logistics type exercise and sacrifice operations events for logistics concerns. We should exercise outside the JCS arena because there are too many players there which complicates matters.

14. To improve realism, build an exercise data base and task the commands to input the products that are required to put the data base together. Then load it at the bases to use it.

15. Actually have all bases dump their wartime requisitions on autodin, that would make it very realistic. Also, we need

to have bases playing and test the communications on the supply side of the house.

16. We could improve realism by getting on line with some of the computer programs like JESS (Joint Exercise and Simulation). The computer simulates the time and gets the scenario going faster.

17. We could make it more realistic by improving the communications and providing ASMA and EIFFEL training. Maybe we could have the Logistics Management Center work up a training package on them.

18. We should change the way we determine requirements. Once the shooting starts the planning is out the window as far as requirements goes. We can not do daily requirements planning, so we use the planned rates regardless of the number of airframes we have left. We consume according to the scenario which is based on the plan. We start with fictitious data bases so why should anyone spend the time since we started with fictitious data. No one cares. We never run out of fuel so why bother playing fuel? No matter how hard we fly, we never run out of anything. Let's be realistic. We deployed sorties around the world in the CPX and were supposed to task them for the next day. That's not realistic.

19. We can add realism through computers and wargaming scenarios. We will react to the scenario. Currently there is no opposition and no response. If we add this, then our exercises will be more realistic.

20. Realism can be added through involvement. We need to get the attention early in the planning cycle. We should shy away from doing one exercise wrap up and working on the next one. It is those same people working the exercises, both CPX and FTX.

21. We can improve realism by letting the response cells and lower headquarters have a bigger part in development of inputs to the scenario. If we get the right people at the response cells, realism will also improve. We should standardize the computers and improve use of STU-III and KI-43 secure communications systems. We need to also be more specific on what is lost in our MSELs. We should delineate by AFSC and by part number.

22. Realism could be improved if we put in real deployments into a CPX for a measure of realism. Also if we gave the response cells the incidents well in advance, they could prepare their responses before the exercise.

24. We can improve realism by practicing as we plan to fight (within reason).

25. We can improve realism by specifically examining particular logistic elements, by not generalizing, and by avoiding simulating agencies, capabilities, etc. If it must be done, ensure the correct people do the simulating. Play the exercises as you would in a crisis and do not develop procedures for the sake of the exercise only to have them disbanded afterwards. We should review final reports from prior exercises before executing the next one. We need to encourage the correct level of participation and do not use exercises to train new personnel--there must be consistency.

26. We can improve realism by allowing the response cells to play their location with what they would actually have available in the war according to the TPFDD flow. We should eliminate the magic and let the fuel run out if it must. Leave it up to the planners to prepare to have fuel flow to the base in a timely manner. Maybe we should let logistics concerns actually stop a base for a short duration and have the response cell inform the higher and request guidance. If the right munitions are not available, then sorry, use what we have--that's the way it works in war. Play attrition, mean time to repair, turn times, and parts. Practice as we plan to fight--its our only chance without getting hit. Get people excited about it and the generals and admirals involved actively.

27. We need a good system to simulate aircraft flying. That will do a lot for everyone. We need to find that spot on the continuum where we can take real world logistics and integrate that in a non disruptive way into the CPX. We can disrupt operations, but we do not want to destroy the objectives of the exercise. There are examples of building exercise play poorly. We should not do (as we have before) nuke a base the day after the response team arrives. It is a waste of the time for the response cell. We should also watch how we groom people to be exercise planners. There is no course to teach you and therefore only pseudo experts. Many can play an exercise, but only a few build them. It is easy to criticize the CPX from the players' perspective, but that should not be done unless they truly understand how to build one and have spent a lot of time building an exercise, they do not have a lot of credibility saying that.

28. Realism can be improved by eliminating mismatches on MSEL items. Often times the data does not match the situation.

30. We can improve realism by eliminating or reducing the

artificialities associated with CPXs and by getting the senior folks involved.

Question 10

4. We should develop a realistic scenario and create a CPX/computer wargame. This could be a valuable logistics tool if it is allowed to run the full length of time. Computer simulation allows the speeding up of events. The impressions left to the boss are success oriented--generals get the impression that they are better off than they actually are--capabilities are better than actually exist.

7. Can't have so much logistics realism that it causes the exercise to come to a halt. There are more goals than just logistic goals, so we must keep that in mind too. There is no such thing as absolute realism. It does no good to stop flying activity during the CPX due to a logistics input. Logistics is not a show stopper, but we should make logistics mean something.

10. We should establish closer ties between wargaming centers and J-8 exercise program. We can use a wargame to set the decisions and CPX to test those decisions procedurally. This gets the high rollers involved, because wargames deal primarily with decisions and CPXs deal with procedures, stressing joint needs and requirements.

11. In war, things will screw up just as much as they do in peacetime. If we consider anything less than that, we are fooling ourselves. Until we come to grips with the reality that things are messed up in the plans, then we will continue to be in trouble. CPXs should be the proving ground for the plans to find the trouble spots and fix them. Even if it is only one thing, that's one the other guys won't get.

12. For overseas, we should do away with off year exercises. We can not fix the discrepancies before the next exercise is there. Perhaps we could have some short two-day exercises to test the fixes to problems.

13. We need to determine the flow of information and who really needs what type of information. The Air Staff wants to know too much minutia (wing commander mentality). We need another way to exercise logistics separately from the JCS program. There is a wide variety between component sitreps and that is not a good thing to have from the procedural aspect. We can not use the normal means of pulling data from our computer systems, which is off line to use during an exercise.

14. We must get the logistics community to convince the operations community that if we (logistics) have a show stopper, that we can't fly it--that's real world. We must quit using mirrors. We always go from a real mechanized system to stubby pencil during CPXs. That's not what we should be doing. If we use computers during peacetime, then why do anything else in an exercise. We should practice as we intend to fight.

16. We need exercises, but it is tough to get people involved in them. Exercises are a good way to get others into the plans. It doesn't do operations any favors if we use smoke and mirrors. It gives them the wrong impression and they will be the ones making many of the decisions later on.

17. We should plan from higher up and all the way down. Get all the levels involved in the planning. We should also specify the AFSCs in the Explan.

18. We need operations play to accurately play logistics, so how can there be a logistics only exercise? Why play a world wide exercise when AFLC plays only 8-hours a day? We can do response cell actions from the headquarters position, so why deploy? The training should tell us why we deploy and what we will do at the location. We do not play the MSELs properly, i.e. how much collateral damage to a hanger from runway damage and what is the overall effect?

19. The are 85+ exercises each year at JCS level. We are beginning to learn from the exercises with the formation of a lessons learned center.

22. We should use messages similar to the ones being sent during a base's quarterly exercises to flow to the battle staff during the CPX or give the bases the MSELs early to staff during their quarterly exercise and then use the messages to flow in the CPX. We should keep the same faces on the MAJCOM battle staffs during the exercise. New faces each night is not a good way to practice. How can you lose 50% of the people and still fly a full up package--that is not realistic? The skeleton crew manning the response cells and battle staffs does not think of that. They only order up the people and do not carry it the next step.

23. We need more exercises like Wintex, but with a longer duration.

24. We must keep the Air Staff and the MAJCOMs talking from the same sheet of music. Air Staff deviates from the script. They should not wait until the exercise starts to tell us what they want in, say an earflap part 2. We need more

emphasis on realism. It is very important to get the most out of these CPXs from a training and war fighting perspective because of the budget cuts.

25. We need to ensure all involved know the purpose of the exercise and what their, and their command's wartime role is. Possibly look at CSMS, WSMIS, or the like, if accredited for proven capability of aircraft/weapon systems.

26. Communications will never be good in war; we should not count on it. We must be able to work things in a manual mode in case the computer craps out. This is a great opportunity to practice war, but we mess it up by oversimulating and ignoring real problems. We exercise too much and don't give ourselves a chance to fix the problems from the last one.

27. Building an exercise is labor intensive to do the job correctly. We do not exercise seriously enough, rather than exercising too much.

28. The security around the exercise was terrible, especially in communications. There were not enough briefings to tell the response cells their role in this exercise. What happens to critique items? Nothing ever gets done with them. We should expose the response cells to different locations to get better idea of how someone else does it.

29. Logistics needs to do more play in CPXs. We should have a purely logistics CPX in order to better assess logistics impact on plans and operations.

APPENDIX C: LOGISTIC RESPONSE CELL AIRCRAFT SIMULATION MODEL

```
{$k}
{Suppresses the keypressed trigger to run time interrupt}
{(c) Copyright 1989, Stephen Hagel}

DECLARE;

 GLOBALS:

        WRSK(3,99): RANDWRSK: I: J: K: N:
        LOAD_CREWS: TRUCKS: LRU: OH: P_F:
        AIRFRAMES: DURATION: TANK: FUEL: ABORTS:
        REPAIR_CREWS: INDEX: A: B: ATTR: ISSUES:
        TYPE(3,1): EPSF: MUN_LOAD: PAA:
        TIME_IN_SYSTEM      OBSERVE_STATS:
        SORTIES             OBSERVE_STATS;

 ENTITIES: ACFT(2): CONTROL(1);

 FILES: KIT_IN, READ: MUN_IN, READ: IN1, READ:
        IN2, READ: KIT_OUT, WRITE: MUN_OUT, WRITE:
        OUT1, WRITE: OUT2,WRITE: KIT_APPEND, APPEND;

 STRINGS: ENTER_KEY;

 DEF_SCREEN: INTRO,1,1,80,25,YES;

+
                A LOGISTICS RESPONSE CELL
                AIRCRAFT SIMULATION MODEL


This program is copyrighted (c) 1989, Stephen J. Hagel

     This model was created for the express purpose to
improve realism in command post exercises (CPXs). It can be
used as a training tool as well, but it is not intended to be
thought of as a predictor of the way things will actually
transpire during a battle. It is a simulation; a tool.

     This model was developed by Major Stephen Hagel as part
of his Masters in Logistics Management from AFIT. The soft-
ware used for this program is called Simple_1 which was
developed by the Sierra Simulations & Software Company.
The compiled version of this program used the company's
RUNSIM compiled software package.

                Press the Enter key
              to begin the simulation
```

```
DEF_SCREEN:  AIRCRAFT,1,1,80,25,YES;

+
```

F-16 AIRCRAFT SIMULATION

TIME:

Airborne	Aborts
Refueling	Fuel Remaining(gallons)
Repair	WRSK Issues
Munitions Load	Aircraft Remaining

```
DEF_SCREEN:  MENU,1,1,80,25,YES;

+
```

SIMULATION PARAMETER SELECTION

Enter the parameter values:

1. How many airframes are tasked by this ATO?
2. How many load crews are available?
3. How many fuel trucks/refueling points do you have?
4. How many repair crews are available?
5. What is the sortie duration (in minutes)?
6. How many munitions will be loaded per aircraft?
7. What type munition is loaded (1, 2, or 3)?
8. What is the fuel consumption rate (gal) per hour?
9. What is the expected attrition rate?

```
     If you are satisfied with your numbers, press 1 to begin
the simulation.  If you wish to change the numbers, press 0
and re-enter your values.


END;

PRERUN;

              SET STOP_TIME:=1200:
                  SORTIES:= 0:   N:= 99: A:= 1: B:= 2:
                  C:= 3: LRU:= 1:   OH:= 2:   P_F:= 3:
                  I:= 0:   EPSF:=0:   J:= 0: K:= 1:
                  ABORTS:=0:   ISSUES:=0:
                  RANDWRSK:= SEED(10*SYS_TIME,3);

{Intro Screen Inputs}

              IF SYS_TIME < 2.0 THEN;
                SCREEN,INTRO,1,1,1,15,1;
                SET KEY_PRESSED:= 0;
                WHILE, KEY_PRESSED=0;
                END_WHILE;
                SET KEY_PRESSED:= 0;
              END_IF;

{Menu Screen Inputs}


MENU_SCREEN       SCREEN,MENU,1,1,1,15,1;
                  ACCEPT,72,7,AIRFRAMES,1,36;
                  ACCEPT,72,8,LOAD_CREWS,1,20;
                  ACCEPT,72,9,TRUCKS,1,20;
                  ACCEPT,72,10,REPAIR_CREWS,1,20;
                  ACCEPT,72,11,DURATION,0.1,720;
                  ACCEPT,72,12,EPSF,1,5000;
                  ACCEPT,72,13,MUN_LOAD,1,3;
                  ACCEPT,72,14,FUEL,1,5000,
                  ACCEPT,72,15,ATTR,0.01,1;
                  ACCEPT,72,20,INDEX;

                  BRANCH INDEX<1,MENU_SCREEN:
                                ,SIM_SCREEN;

SIM_SCREEN        SCREEN,AIRCRAFT,1,1,1,15,1;
                  SCREEN,AIRCRAFT,0,0,0,10,0;
                  SET STOP_TIME:=1800;

END;
```

```
DISCRETE;
                CREATE,1,CONTROL,1,1;
                SHOW,72,3,STIME,4,0,14,6;
            KILL;

(Simulation Screen Inputs)

            MONITOR MISSION;
            CHART,15,6,2,127,NUM(MISSION),24,1,7;
            SHOW,15,7,NUM(MISSION),7,0,7,0;
            END_MONITOR;
            MONITOR SERVICE;
            SHOW,15,12,NUM(SERVICE),7,0,7,0;
            CHART,15,11,2,127,NUM(SERVICE),24,4,7;
            END_MONITOR;
            MONITOR REPAIR;
            CHART,15,16,2,127,NUM(REPAIR),24,1,7;
            SHOW,15,17,NUM(REPAIR),7,0,7,0;
            END_MONITOR,
            MONITOR LOAD;
            CHART,15,21,2,127,NUM(LOAD),24,1,7;
            SHOW,15,22,NUM(LOAD),7,0,7,0;
            END_MONITOR;
            MONITOR G_ABORTED;
            (CHART,50,6,2,127,NUM(G_ABORTED),24,1,7;)
            SHOW,50,7,ABORTS,7,0,7,0;
            END_MONITOR;
            MONITOR REFUELING;
            SHOW,50,12,TANK-(FUEL*(DURATION/60)),7,0,7,0;
            END_MONITOR;
            MONITOR RITE_DATA;
            SHOW,50,17,ISSUES,7,0,7,0;
            END_MONITOR;
            MONITOR LEFT;
            SHOW,50,22,PAA,7,0,7,0;
            END_MONITOR;

(SIMPLE_1 MAIN PROGRAM)

(Aircraft are being generated for launch.  Fuels file is
opened and written to the screen.  Number of aircraft
available for tasking opened and displayed on the screen.
After the -6 preflight and -1 aircrew preflight, the sorties
are launched.  They will either ground abort, air abort,
complete the mission, or be shot down. )

             CREATE,1,ACFT,1,1,AIRFRAMES;
            SET ACFT(1):= STIME:
                ACFT (2):=0;
            SHOW,72,3,STIME,4,0,14,6;
```

```
                    SET ISSUES:= 0;
                    SHOW,50,17,ISSUES,7,0,7,0;
                    OPEN, IN1 AS 'A:FUELS.DTA';
                    READ, IN1, TANK:/;
                    SHOW,50,12,TANK,7,0,7,0;
                    CLOSE,IN1;
                    OPEN, IN2 AS 'A:ATTRIT.DTA';
                    READ, IN2, PAA:/;
                    SHOW,50,22,PAA,7,0,7,0;
                    CLOSE, IN2;

ACFT_AVAILABLE      BRANCH, CREWPREFLT;

CREWPREFLT          ACTIVITY LOGNORMAL (40,5,1);

G_ABORTCHECK        BRANCH 0.03, G_ABORTED:
                           0.97, A_ABORTCHECK;

A_ABORTCHECK        BRANCH 0.03, ABORTLAND:  0.97, MISSION;

MISSION             ACTIVITY LOGNORMAL (DURATION,15,2);
                    SET SORTIES:= SORTIES + 1:
                        ACFT(2):=ACFT(2)+1;
                    BRANCH ATTR, LOSES_Q: (1 - ATTR), LAND;

LOSES_Q             QUEUE, FIFO;
                    CONDITIONS, NUM(LEFT)<=1, LOSES_Q.,LEFT;

LEFT                ACTIVITY 0;
                    OPEN, IN2 AS 'A:ATTRIT.DTA';
                    READ, IN2, PAA:/;
                    CLOSE, IN2;
                    IF PAA >= 0 THEN;
                      SET PAA:= PAA - 1;
                      OPEN, OUT2 AS 'A:ATTRIT.DTA';
                      WRITE,OUT2, PAA,3,0:/;
                    END_IF;
                    CLOSE, OUT2;
                    BRANCH, READY_TO_FLY;

{The aircraft have either landed or returned from an abort.
In this maintenance stage, they will be refueled and the fuel
file updated, parts will be issued from the WRSK and that
file updated, they will run through various maintenance
actions to establish the time to turn the sorties, and they
will be loaded with munitions for the next sortie and the
munitions file will be updated.  After those actions are
completed, the sorties are ready to go and the model is
terminated.  }


LAND                BRANCH, SERVICE_Q;
```

```
G_ABORTED       ACTIVITY 1;
                SET ABORTS:= ABORTS + 1;
                BRANCH, REPAIR_Q;

ABORTLAND       ACTIVITY 1;
                SET ABORTS:= ABORTS + 1;

SERVICE_Q       QUEUE,FIFO;
                CONDITIONS,NUM(REFUELING)<TRUCKS,
                                        SERVICE_Q,
                                       ,SERVICE;

SERVICE         QUEUE,FIFO;
                CONDITIONS,NUM(REFUELING)<=1,SERVICE,
                                           ,REFUELING;

REFUELING       ACTIVITY TRIAG (20,23,27,4);
                OPEN, IN1 AS 'A:FUELS.DTA';
                READ, IN1, TANK:/;
                CLOSE, IN1;
                IF TANK >= 0 THEN;
                  SET TANK:= TANK - (FUEL*(DURATION/60));
                  OPEN, OUT1 AS 'A:FUELS.DTA';
                  WRITE, OUT1, TANK,10,0:/;
                END_IF;
                CLOSE, OUT1;
                SPLIT,ACFT,1,SUPPLY_Q;

SUPPLY_Q        QUEUE, FIFO;
                CONDITIONS, NUM(READ_DATA) <= 1, SUPPLY_Q,
                                               ,PROC_PART;

PROC_PART       WHILE, SORTIES <= AIRFRAMES;
                  OPEN, KIT_IN AS 'A:PARTS.DTA';
                  SET I:= 1;
READ_DATA         WHILE, EOF(KIT_IN)<>1;
                    READ, KIT_IN, WRSK(LRU,I): WRSK(OH,I):
                                  WRSK(P_F,I):/;
                    SET I:= I + 1;
                  END_WHILE;
                  SET N:= I - 1;
                  CLOSE, KIT_IN;

RITE_DATA         OPEN, KIT_OUT AS 'A:PARTS.DTA';
                  OPEN, KIT_APPEND AS 'A:NEWWRSK.DTA';
                  SET I:= 1;
                  WHILE, I <= N;
                    SET RANDWRSK:= (UNIFORM(0,1,2));
                    IF (WRSK(P_F,I)*DURATION/60) > RANDWRSK
                                                 THEN;
```

```
                    SET WRSK(LRU,I):= WRSK(LRU,I):
                        WRSK(OH,I):= WRSK(OH,I) - 1:
                        WRSK(P_F,I):= WRSK(P_F,I):
                        ISSUES:= ISSUES + 1;
                    WRITE, KIT_OUT, WRSK(LRU,I),15,0:
                                    WRSK(OH,I),5,0:
                                    WRSK(P_F,I),8,5:/;
                    WRITE, KIT_APPEND, WRSK(LRU,I),15,0:
                                       WRSK(OH,I),5,0:
                                       WRSK(P_F,I),8,5:/;
                  ELSE;
                    IF WRSK(P_F,I) < RANDWRSK THEN;
                      SET WRSK(LRU,I):= WRSK(LRU,I):
                          WRSK(OH,I):= WRSK(OH,I):
                          WRSK(P_F,I):= WRSK(P_F,I);
                      WRITE, KIT_OUT, WRSK(LRU,I),15,0:
                                      WRSK(OH,I),5,0:
                                      WRSK(P_F,I),8,5:/;
                       WRITE,KIT_APPEND, WRSK(LRU,I),15,0:
                                         WRSK(OH,I),5,0:
                                         WRSK(P_F,I),8,5:/;
                      END_IF;
                    END_IF;
                    SET I:= I + 1;
                  END_WHILE;
                  CLOSE, KIT_OUT;
                  CLOSE, KIT_APPEND;
                  SPLIT,ACFT,1,MAINT_Q;
                END_WHILE;

MAINT_Q           BRANCH 0.35,REPAIR_Q: 0.65, INSPECT;

REPAIR_Q          QUEUE,FIFO;
                  CONDITIONS,NUM(REPAIR)<REPAIR_CREWS,
                                        REPAIR_Q,
                                       ,REPAIR;

REPAIR            ACTIVITY TRIAG (15,75,720,5);
                  BRANCH 0.97, INSPECT: 0.03, G_ABORTCHECK;

INSPECT           BRANCH 0.15, HPO:
                         0.85, PARK;

HPO               ACTIVITY LOGNORMAL (120,30,9);
                  BRANCH, GROUNDPREFLT;

PARK              ACTIVITY 15;
                  BRANCH 0.20, GROUNDPREFLT: 0.80, INSP2B;

INSP2B            ACTIVITY LOGNORMAL (60,10,10);
                  BRANCH, LOAD_Q;
```

```
GROUNDPREFLT        ACTIVITY TRIAG (60,90,120,1);
                    BRANCH, LOAD_Q;

LOAD_Q              QUEUE,FIFO;
                    CONDITIONS,NUM(LOAD)<LOAD_CREWS,
                                        LOAD_Q,,LOAD;

LOAD                ACTIVITY TRIAG (30,32,40,2);
                    BRANCH, ACFT_LOAD;

ACFT_LOAD           QUEUE, FIFO;
                    CONDITIONS,NUM(LOAD_ACFT)<=1,ACFT_LOAD,
                                        ,READY_TO_LOAD;

READY_TO_LOAD       WHILE, NUM(ACFT_LOAD)<= AIRFRAMES;
                      OPEN, MUN_IN AS 'A:MUNITION.DTA';
                      SET J:= 1;
LOAD_ACFT             WHILE, EOF(MUN_IN)<>1;
                        READ, MUN_IN, TYPE(A,J): TYPE(B,J):
                                      TYPE(C,J):/;
                        SET J:= J + 1;
                      END_WHILE;
                      SET K:= J - 1;
                      CLOSE, MUN_IN;

MRITE                 OPEN, MUN_OUT AS 'A:MUNITION.DTA';
                      SET J:= 1;
                      WHILE, J <= K;
                        SET MUN_LOAD:= MUN_LOAD;
                        IF MUN_LOAD = 1 THEN;
                        SET TYPE(A,J):= TYPE(A,J) - EPSF:
                            TYPE(B,J):= TYPE(B,J):
                            TYPE(C,J):= TYPE(C,J);
                        WRITE, MUN_OUT, TYPE(A,J),5,0:
                                        TYPE(B,J),5,0:
                                        TYPE(C,J),5,0:/;
                        ELSE;
                          IF MUN_LOAD = 2 THEN;
                          SET TYPE(A,J):= TYPE(A,J):
                              TYPE(B,J):= TYPE(B,J) - EPSF:
                              TYPE(C,J):= TYPE(C,J);
                          WRITE, MUN_OUT, TYPE(A,J),5,0:
                                          TYPE(B,J),5,0:
                                          TYPE(C,J),5,0:/;
                            ELSE;
                              IF MUN_LOAD = 3 THEN;
                              SET TYPE(A,J):= TYPE(A,J):
                                  TYPE(B,J):= TYPE(B,J):
                                  TYPE(C,J):= TYPE(C,J) - EPSF;
```

```
                                WRITE, MUN_OUT, TYPE(A,J),5,0:
                                                TYPE(B,J),5,0:
                                                TYPE(C,J),5,0:/;
                                  END_IF;
                                END_IF;
                              END_IF;
                              SET J:= J + 1;
                            END_WHILE;
                            CLOSE, MUN_OUT;
                            SET TIME_IN_SYSTEM:=STIME-ACFT(1);
                            SPLIT,ACFT,1,READY_TO_FLY;
                          END_WHILE;

READY_TO_FLY        KILL;

END;

CONTINUOUS;

END;

POSTRUN
                    STOP;
END;
```

APPENDIX D: LOGISTICS RESPONSE CELL AIRCRAFT SIMULATION USER'S GUIDE

Introduction

The Logistics Response Cell Model was developed to make response cell play during command post exercises (CPX) more realistic. The program provides a great deal of flexibility for the users based upon the selections made during the initial stages of the program. In response to exercise ATOs, it calculates the remaining fuel quantity in gallons as well as the munitions consumption for two types of munitions. It can use the unit's actual war readiness spares kit (WRSK) or a higher headquarters provided kit to estimate spare parts requirements. It can also generate attrition for each air tasking order (ATO). With this model, the response cell can better perform its mission during a CPX, that being to provide meaningful (and realistic) inputs for the higher headquarters' battle staffs and training for each unit involved in the exercise.

The program has five parts: the simulation, the fuels file, the WRSK file, the aircraft file, and the munitions file. Information for the four resource files can be obtained from a variety of sources, but it is intended that the response cell use the information from its deployed location or forward operating base (FOL). As mentioned, the WRSK listing could be the unit's own kit or it could be a kit edited by the major command or even AFLC so they can have

certain key spares played heavily during an exercise. Whatever the source, the key to using the tool rests with the user and the inputs he makes with it.

Although designed for use during the command post exercise, this tool can also be used for local exercises to generate spares consumption based on the number of aircraft flown. It should be viewed as a learning tool to help those who have less experience in their jobs to make better decisions and responses to higher headquarters' taskings.

The guide is written with a few assumptions in mind. First, it assumes that the user has a basic understanding of an MS-DOS computer, such as an IBM PC-AT or a Zenith Z-248. It also assumes the user understands how to use some sort of text editor to update the four files. The text editor, TED, is included with the disk. There are no advanced programming skills required. The remainder of this user's guide covers how to run the model, where to get the information for the parameters and files, and what to do with the information after the simulation terminates.

Running The Model

The base level logistics system is difficult to model in its entirety, so only the most important elements, which together largely determine sortie production, were selected for the simulation at a level of detail appropriate to exercises. Among those elements are the four resource files listed in figure 1. With the exception of the WRSK file, the

information in these files is easy to edit and allows for simple manipulations. The fuels and aircraft files contain only one record each, the amount of fuel storage available and the number of aircraft available respectively. The munitions file contains three records which represent the amount of three types of munitions available for use. The WRSK file contains 99 records of information, but it is only three fields wide. The fields are the National Stock Number (NSN), the on-hand quantity (OH), and the probability of issue per flying hour (P_F). These four files, together with the timing criteria and statistical distributions in the model, allow the logistics system to be exercised in specific probabilistic ways. The actual test file for the WRSK is included as an attachment to this document.

LOGISTICS RESPONSE CELL AIRCRAFT SIMULATION FILES

FILE	PURPOSE	LIMIT
A:ATTRIT.DTA	Monitor Aircraft Attrition	1
A:FUELS.DTA	Monitor Fuel Consumption	1
A:MUNITION.DTA	Monitor WRSK Consumption	99
A:MUNITION.DTA	Monitor 3 Munition Types	3

Figure 1. LOGSIM FILES

To begin program, load the disk containing the program and the resource files in the A drive. At the 'A' prompt, type LOGSIM.BAT and press Return. This begins a batch file on the disk which displays the main menu for the program. The menu screen is shown in figure 2. This menu prompts the user for two basic tasks: edit files or run the simulation. To quit the program requires no input since the program always returns to the "A" prompt.

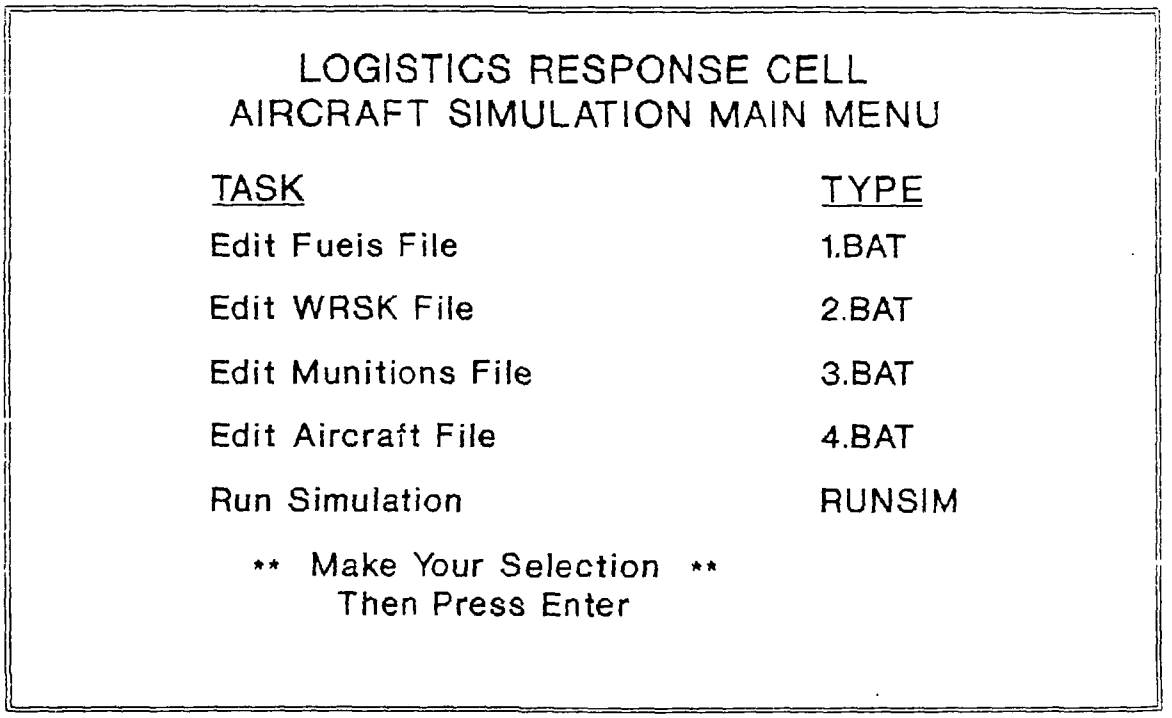

Figure 2. LOGSIM MAIN MENU

If there is a need to edit one of the files, make the appropriate selection from the menu. For example, typing 2.BAT invokes the editor function and the A:PARTS.DTA file. Once in the file, the data is presented along with a menu at

the bottom of the screen. The cursor keys can be used to move within the file and changes are made by typing in the appropriate data. The user may then change the information within the file to reflect any shipments or other than issue consumptions such as a fire destroying part of the warehouse. When all the changes have been made, press the F7 key as indicated by the menu. The prompt will display "Save As:" with the appropriate file name, in this case A:PARTS.DTA. Pressing return at the prompt saves the file and returns the user to the main menu screen. The other editing functions work in the same manner.

To run the simulation, type RUNSIM and press Return which activates the compiled program from the disk. The first thing you will see is the credit screen and then, by pressing the Enter (or Return) key, the simulation will begin by asking for some inputs. These will be covered later in the guide. After the program terminates, the main menu screen will reappear awaiting the next action.

Getting Started

Before departing for response cell duties, team members need to gather some important information necessary to operate the simulation, since it is designed to act somewhat realistically by using the information for the fuels, munitions, and WRSK programmed to be available when the unit goes to war. This additional information is requested by the

parameter input screen through a series of nine questions as shown in figure 3.

The first question asks "How many airframes are tasked by this ATO?" Aircraft information should be available from the operations or maintenance personnel on the response cell.

The second question is "How many load crews are available?" This information can be obtained from the munitions squadron on the base prior to departure or from the deployed chief of maintenance.

LOGISTICS RESPONSE CELL
PARAMETER LIMITATIONS

PARAMETER	LIMITS
Airframes	1 - 36
Load Crews	1 - 20
Trucks/Refueling Points	1 - 20
Repair Crews	1 - 20
Duration	1 - 720 (minutes)
Munitions	1 - 5000 (per sortie)
Munition Type	1 - 3
Fuel Consumption	1 - 5000 (gallons)
Attrition Rate	.01 - 1 (per sortie)

Figure 3. Simulation Parameter Screen

Question three is "How many fuel trucks/refueling points do you have?" This is the number expected to be at the deployed location or FOL. The logistics plans division, plans and programs office, the fuels cell, or the gaining locations' base support plan are likely sources.

Question four is "How many repair crews are available?" This is a difficult question to research and to model. Each unit is very different from the others and each command is also much different. Contact the maintenance analysis or programs personnel to get this one answered. They may well direct you to the Deputy Commander for Maintenance. The purpose of this number is to approximate the repair capability of the unit, not actual repair crews, so judgement is called for in selecting an input.

The best source for the next five questions is the operations personnel on the response cell. Question five is "What is the sortie duration (in minutes)?" This information will be calculated at the deployed site based upon the target location.

Question six is "How many munitions will be loaded per aircraft?" The answer to this question again is dependent on the target tasked in the ATO. Some targets require missiles to kill while others may need a 500 pound bomb. The program allows only three different types of munitions to be loaded, so you will want to know the maximum number of rounds or

munitions which your particular airframe would carry on a normal mission.

Question seven is "What type munition is loaded (1, 2, or 3)?" The user will have to remember which type is which. For example, type 1 might be MK-82 bombs, type 2 might be AGM-86 missiles, and type 3 might be AIM-7s. As shown earlier, this information is stored in the file called "A:MUNITION.DTA".

Question eight is "What is the fuel consumption rate (gal) per hour?" This calculation is based on gallons, not pounds.. If you only have a pounds estimate, use a conversion factor of 6.5 pounds of fuel per gallon. The actual pounds per gallon varies between 6.3 and 6.9 or so, but 6.5 is a good conservative estimate.

Question nine is "What is the expected attrition rate?" This information will most likely come to the response cell via the ATO or it will be listed in the exercise plan.

Finally you will be permitted to change the information you just entered. Your other inputs come through the resource files.

In order to edit the information contained in the files, you need a text editor. The only caution on editing is that you must save the file as a text file by the same name. Once again, if it is not saved by the correct name, the computer will not find the information. The text editor, TED, is included on the disk as a useful editor for this program.

The Program

The program models the actions of the response cell as if there were aircraft actually flying. It covers the entire process from receipt of the ATO through recovery. The flow of the program is shown in figure 4.

After the user inputs the data and the model begins, the first activity the aircraft engage in is the -6 preflight inspection. Here the ground crew is simulated as preparing the aircraft for flight. The next activity is the air crew preflight. The model uses standard times for the calculation of the air crew preflight of a most likely time of 40 minutes with a standard deviation of 5 minutes.

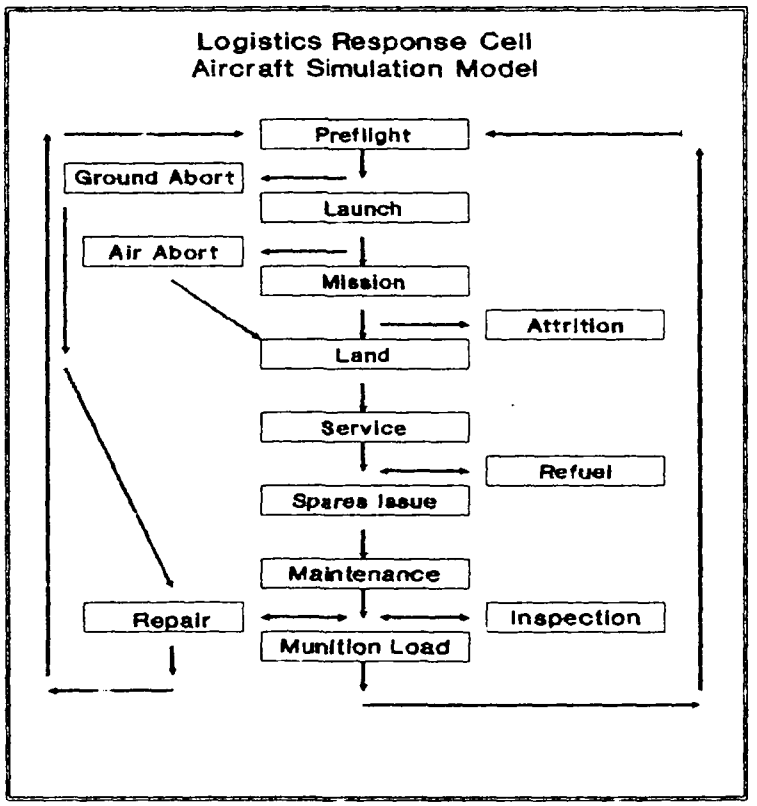

Figure 4. Simulation Flow Chart

After the inspections, the aircraft are assumed to be mission ready. They will be launched at a rate of one each minute until all the tasked sorties have entered into the launch phase. Within this phase, the aircraft will either ground abort, air abort, fly their mission, or be shot down. Percentages for the ground and air abort rates are internal to the program. The rate selected for both of these activities was three percent.

The user enters the rate for attrition. Possible value entries for attrition are from .01 to 1. The duration of the mission is also entered by the user. This simulation software allows the model to incorporate distributions. In the real world some aircraft will fly the exact duration of the mission, but more likely than not there will be a majority of the sorties which will either come back a bit early or late. The model takes this into consideration via the distribution and its parameters.

If the aircraft air aborts, it goes directly into the recovery phase, where it is serviced, repaired an made ready to launch for the next mission. If the aircraft ground aborts, it by-passes the fuels servicing function and goes straight to maintenance for repair. This would be what to expect if the aircraft were actually flying since this airframe is still nearly fully loaded. If the aircraft is shot down or in some other way attritted, it will leave the simulation.

Once the aircraft return to base, they are recovered. This process includes fuel servicing, maintenance repair, spares consumption, and munitions loading. The fuel servicing uses a triangular distribution which captures the most likely time it would take to accomplish refueling, the minimum time expected, and the maximum time expected. The model takes into consideration the different times it takes people to accomplish a refueling action, the equipment available, and the difference in amount of fuel required. Times chosen for the model for this activity were 20 minutes, 23 minutes, and 27 minutes respectively.

After servicing, the spares are selected from the WRSK. As each aircraft recovers, a random number is assigned to it and that number is compared against all the probabilities in the kit. If the number is less than the probability for an item, that item is simulated as issued from the kit and the kit is decremented by one in the on hand column. This is accomplished for each aircraft and each part. If there is an issue, the kit is updated prior to the next airframe being assessed.

The program provides an updated WRSK file and an historical record of all the parts each time an aircraft recovers. The historical record is contained in the file entitled "A:NEWWRSK.DTA". The file gets very large, very quickly. As a result, it must be printed after 75 sorties have been simulated or else the program will terminate

abruptly. After the file has been printed, delete it. It will automatically be recreated by the simulation.

The next activity introduces a time delay for maintenance actions. The model looks at the time to repair an aircraft. This is based on a triangular distribution with some very broad ranges from 15 minutes to 720 minutes with a normal expected time of 75 minutes. The aircraft go through some of the various phases of maintenance, such as hourly post flight, through flight, and a 2B inspection. Each of these stages has a distribution associated with it. Hourly post flight assumes a 120 minute normal time to accomplish the activity with a standard deviation of 30 minutes. Through flight uses a minimum time of 45 minutes, a most likely time of 90 minutes, and a greatest time of 120 minutes. The 2B inspection has a normal time of 60 minutes with a standard deviation of 10 minutes.

The last activity is munitions loading. Here, the munitions file is updated based upon the number and type of munitions consumed. Loading time also has a triangular distribution associated with it, with a normal time of 32 minutes to load, a minimum of 30 minutes, and a maximum of 40 minutes. After loading, the aircraft move to the ready-to-fly phase for the next launch.

What To Do With It

Response cell players can use model outputs for inputs to the battle staff. The cell can requisition spares, use

the munitions information for munitions reporting, the fuel file for POL status, and the attrition file to decrement the number of airframes possessed. Time can also be considered for logistics actions such as turning aircraft.

The computer and the program are tools to help response cell members do their job more realistically and to help provide better training for response cells. It is not an end all, nor is it the gospel simply because a computer provided the output. It is a model, developed using real world times for accomplishing actions and real world data files. The model applies some standard times to perform various functions like refueling. Distributions are added because rarely does an event happen exactly on schedule. The simulation makes it unnecessary to consider every variable because it uses some key variables of the real world in the modelling. It does not provide a completely realistic picture in itself. It does use actual data for the calculations, "expert opinions", and average times to accomplish tasks from a peacetime perspective, and allows the response cell to update selected information based on the scenario of the exercise.

When using the model, exercise participants should challenge the results, not accept them because the computer said they were okay. It is important to make sure inputs are valid and correct too, because if they are not, the output will not be either. Recommended improvements to the program,

should be addressed to the developer through the Air Force Institute of Technology.

APPENDIX E: CORONET WARRIOR WRSK

NATIONAL STOCK NUMBER	NOMENCALTURE	AUHTORIZED	PROBABILITY OF ISSUE
1005000566753	20MM M61A1 GUN	1	.0005455
1005006999935	20MM M61A1 GUN	6	.0000000
1005007755576	20MM GUN NOC	2	.0000000
1005007852609	20MM M61A1 GUN	6	.0000000
1005007879802	20MM GUN BARREL SET	6	.0000000
1005009224554	GUN DRIVE ASSY	4	.0000000
1005010086283	20MM GUN NOC	5	.000546
1005010418667	GUN HYD DRIVE	4	.0000000
1005010429821	BREECH BOLT ASSY	18	.004910
1005010446174	AMMO DRUM UNIT ASSY	3	.000000
1005010463536	AMMO TRANSFER UNIT	12	.001637
1005010502735	AMMO EXIT UNIT	6	.0010911
1005010502736	AMMO ENTRANCE UNIT	6	.0010911
1005010556484	AMMO LOADING ACCESS	9	.0010911
1005010556546	AMMO RETURN CHUTE B	8	.0000000
1005010559840	AMMO ELEMENT CHUTE	8	.0
1005010559901	AMMO FEED CHUTE	8	.0
1005010559902	AMMO RETURN CHUTE A	8	.0010911
1005012344080	GUN LUBRICATOR	8	.0
1095011003892	MAU12C EJECTOR RACK	6	.0
1260011938861	FC MULTIFUNCTION DSP	4	.0005455
1260012511150	FC PROG DISPLY GEN	4	.0016366
1270010557373	GUN CONTROL UNIT	2	.0
1270012319800	FC PROG SIGNAL PROC	10	.001637
1270012330011	FC MODULAR LPRF	8	.0016366
1270012352370	FC ENHANCED COMPUTER	8	.003273
1270012383662	FC DUAL MODE XMTR	14	.0043644
1270997207741	HUD ELECTRONIC CNTRL	4	.000546
1270997714187	HUD DISPLAY	8	.000546
1280011091499	HUD MOUNTING UNIT	15	.000364
1280011709363	ADVANCED REMTE INTFC	3	.0005455
1280011963702	FC DATA TRNSFR UNIT	3	.0021822
1280012279260	WD CENTRAL INTERFACE	7	.0016366
1440012386919	UNDERWING LAUNCHER	2	.0000000
1560011026385	HYDRAZINE TANK	2	.000546
1560011358956	HORIZ STAB LEAD EDGE	2	.0
1620010492910	NWS INPUT POTENTIOMR	1	.0
1620010540042	NLG STEERING VALVE	1	.0
1620010569655	NWS STEERING ACTUATR	1	.0
1620010710535	MLG LH AXLE ASSY	3	.0
1620010710537	MLG RH AXLE ASSY	1	.0
1620011251559	NLG EXT/RETRT ACTUAT	1	.0
1620011365173	NW STEERING CNTRL BX	2	.0
1620011627518	NLG SHOCK STRUT	1	.0
1620011951141	MLG LH SHOCK STRUT	3	.0

NATIONAL STOCK NUMBER	NOMENCALTURE	AUHTORIZED	PROBABILITY OF ISSUE
1630008521432	NOSE LDNG GEAR WHEEL	20	.0005455
1630010389239	MAIN LDNG GEAR WHEEL	30	.0
1630010848399	MLG BRAKE VALVE	3	.0
1630011184492	BRAKE CONTROL BOX	2	.0
1630011996430	BRAKE ASSEMBLY	12	.0043644
1630012173141	WHEEL SPEED SENSOR	2	.0
1630012173142	ANTI-SKID CNTRL BOX	3	.0
1650010568914	EMER HYDRAULIC PUMP	1	.0
1650011061594	RUDDER SERVOACTUATOR	1	.000546
1650011297553	NLG DOOR ACTUATOR	1	.000546
1650011590277	LEAD EDGE POWER DRVE	1	.000546
1650011657203	FLAPERON ACTUATOR	5	.000273
1650012289276	CONSTANT SPEED DRIVE	2	.001091
1660001952729	OXYGEN BREATH REG	12	.0
1660005678852	5 LITER LOX CONVERTR	8	.000546
1660010525354	A/C WATER SEPARATOR	1	.0
1660011408406	A/C	1	.0
1660011559146	A/C COOLING TURBINE	1	.0
1660011965999	A/C	3	.001091
1660012176555	A/C BLEED AIR S/O VL	1	.000546
1660012361136	A/C SENSOR CONTROLLR	1	.0
1680010510534	CHAFF-FLARE DISP PNL	1	.0
1680010573391	AERIAL REFUEL RECEP	1	.0
1680010841544	PILOT'S LG CNTRL	2	.000546
1680010951750	5 LITER LOX CONVERTR	2	.0005455
1680011146248	FWD THRTLE GRIP ASSY	5	.001091
1680011295004	MLG RH DOOR UPLK ACT	1	.0
1680011484167	CANOPY	2	.0
1680011655932	HALON RESERVOIR	16	.0
1680012301279	STA 3&4 ROTARY ACT	2	.0
1680012301280	STA 1&2 ROTARY ACT	2	.0
1680012585608	EPU CONTROLLER	2	.0
2620011426461	MAIN LDNG GEAR TIRE	180	.049918
2620011573821	NOSE LDNG GEAR TIRE	60	.019640
2835010738989	EPU GAS GENERATOR	2	.0
2835011156111	POWER TAKEOFF SHAFT	3	.0
2835011160006	EPU TURBINE POWER UT	1	.0
2835011543533	JET FUEL STARTER	3	.0
2840010865208	EXTERNAL AUG SEGMENT	11	.0
2840011028596	LUB OIL TANK	2	.0
2840011559148	DIVER NZZLE AUGMNTOR	15	.000036
2840011802935	CONVER SEG LINE SEAL	5	.0
2840011802941	CONVER SEG LINE FLAP	10	.0
2840012543054	DIVER NZZLE SEG SEAL	30	.000291
2910011355681	FUEL CONTROL ASSY	2	.0
2915009306611	MOTOR OPER S/O VALVE	1	.0
2915010350276	CONVER EXHAUST CNTRL	3	.000546
2915010414481	FUEL FLOW PROPORTION	1	.0

NATIONAL STOCK NUMBER	NOMENCALTURE	AUHTORIZED	PROBABILITY OF ISSUE
2915010659589	AUGMENTOR FUEL PUMP	1	.0
2915010819055	N2 HYDROMECH SENSOR	1	.0
2915010924448	WING SCAVENGE PUMP	1	.0
2915011332467	BACKUP FUEL CONTROL	1	.0
2915011376551	AUGMENTOR FUEL CNTRL	1	.0
2915011620997	MAIN FUEL PUMP	3	.0
2915011793854	ENG COUPLNG DISCONEC	1	.0
2915011807299	MAIN FUEL PUMP	3	.0
2915011819813	FUEL BYPASS VALVE	1	.0
2915011862454	MOTOR OPER S/O VALVE	2	.0
2915012016783	FUEL CONTROL	4	.0
2915012039538	ELECTRONIC CONTROL	3	.000546
2925003934670	ENGINE IGNITER PLUG	10	.0
2925010228332	DUAL INGITION EXCITE	1	.000546
2925011150306	JFS CONTROLLER	3	.0
2925011802149	GENERATOR STATOR	1	.0
2995010608514	EXT TANK XFER VALVE	3	.0
2995010995028	INLET VAR VNE CNTRL	1	.0
4320000620511	ENG DRIVE HYD PUMP	1	.000273
4320000639617	COLD PLATE ASSY	1	.0
4810010503368	2WAY HYD SOLEDOID VL	1	.0
4810010503369	HYDR SOLENOID VALVE	1	.0
4810010546013	INERT SYS SOLEND VLV	3	.001091
4810010734200	NLG DOOR SEQ VALVE	1	.0
4810010996392	NITROGEN VALVE PACK	2	.0
4810011237254	EXT TANK VENT/PRESS	1	.000546
4810011307379	BLEED AIR S/O VALVE	1	.0
4810011372476	MLG SELECTOR VALVE	1	.0
4810011530975	A/C 7 STG S/O VALVE	1	.000546
4810011711880	HYD DOOR CNTRL VALVE	4	.0
4810012257171	ROTOR & STATOR ASSY	1	.0
4820010731798	CANOPY SEAL CK VALVE	2	.000546
4820011107775	FUEL SHUTTLE VALVE	1	.0
5821010621019	VHF RADIO REC'V/XMTR	4	.0027277
5821012287057	UHF RADIO REC'V/XMTR	9	.0021822
5826010121938	TACAN REC'V/XMTR	2	.0016366
5826010409798	ILS RECEIVER	1	.0
5831005358123	GRND STAT CNTL AMP	1	.001091
5831006232912	INTERCOM AMPLIFIER	1	.0
5841012301284	SIGNAL DATA CONVRTR	6	.0
5841012469183	RADAR ALT REC'V/XMTR	5	.0
5865000037464	LOW OUTPUT PWR SUP	2	.002182
5865000076945	MICROWAVE OSC ASSY	1	.0
5865000076949	MICROWAVE OSC HIGH	4	.0010911
5865000076950	DRIVE CONTROL	1	.0
5865000094381	OUTPUT, TWT, LOW	2	.0005455
5865001559243	PC, ELEC ASSY	2	.0
5865001559264	HIGH VIDEO AMP	2	.0

NATIONAL STOCK NUMBER	NOMENCALTURE	AUHTORIZED	PROBABILITY OF ISSUE
5865001559266	OUTPUT, TWT, HIGH	6	.000273
5865001559489	PC, ELEC ASSY, MID	3	.000546
5865001627964	MICROWAVE OSC ASSY	1	.0
5865001854444	PC, ELEC ASSY	4	.000546
5865001955987	PC, ELEC ASSY	1	.0
5865001994195	RELAY & CONTROL ASSY	2	.001091
5865003073292	PC, ELEC ASSY, HIGH	10	.0
5865003151482	IF RC ASSY	3	.0
5865003217636	PC, ELEC ASSY, HIGH	3	.0
5865003655459	RF ASSY, MID	7	.0
5865003713344	QRC 80-01 OSCILLATOR	9	.000546
5865004520326	PC, ELEC ASSY	4	.0
5865004723317	ELEC ASSY	1	.0
5865004764443	QRC 80-01 ELECT TUBE	13	.002182
5865005562036	PC, ELEC ASSY	1	.0
5865005562037	PC, ELEC ASSY, HIGH	1	.0
5865005562039	PC, ELEC ASSY	4	.0
5865005562055	PC, ELEC ASSY	3	.0
5865005562103	PC, ELEC ASSY	1	.0
5865005562104	PC, ELEC ASSY	2	.000364
5865005562122	PC, ELEC ASSY	4	.000182
5865005562124	FWD ANT MODULE ASSY	5	.000546
5865005562141	FWD ANT MODULE ASSY	1	.0
5865007598099	OUTPUT TWT, MID	3	.000273
5865010211647	CHAFF-FLARE PROGRMMR	1	.0
5865010441700	FLARE PAYLOAD MODULE	33	.0
5865010450982	CHAFF-FLARE DISPENSR	7	.0008183
5865010481589	CNTRL UN, C-9492ALQ	9	.0032733
5865010491178	AUX IND CNTRL PANEL	1	.0
5865010540018	CHAFF PAYLOAD MODULE	33	.0
5865010558592	CHAFF-FLARE EMI FLTR	7	.0
5865010770497	OUTPUT PWR SUP, HIGH	5	.001091
5865010805675	FSRS AMP DETECTOR	3	.0010911
5865010920386	CHAFF-FLARE SEQ SWCH	5	.0
5865011074586	AZIMUTH INDICATOR	1	.0
5865011106043	FSRS RECEIVER	2	.0010911
5865011133354	AFT ANT MODULE ASSY	14	.0
5865011163884	RF ASSY, 14164	1	.0
5865011202041	PC, ELEC ASSY, MID	5	.0
5865011213832	PC, ELEC ASSY, HIGH	3	.000546
5865011244985	PC, ELEC ASSY, MID	3	.0
5865011311336	PC, ELEC ASSY	1	.0
5865011526690	AFT ANT MODULE ASSY	3	.0
5865011526691	AFT ANT MODULE ASSY	7	.0
5865011526692	AFT ANT MODULE ASSY	7	.0
5865011527409	PC, ELEC ASSY, MID	3	.000546
5865011527410	ELECTRONICS ASSY	3	.0
5865011527425	TRANSMIT MODULE B	3	.0

NATIONAL STOCK NUMBER	NOMENCALTURE	AUHTORIZED	PROBABILITY OF ISSUE
5865011527426	AFT ANT MODULE ASSY	3	.0
5865011527427	AFT ANT MODULE ASSY	1	.0
5865011532214	AFT ANT MODULE ASSY	3	.0
5865011538757	AFT ANT MODULE ASSY	4	.0
5865011549042	DRIVER, TWT, LOW	5	.001091
5865011549125	FWD AMP DETECTOR	8	.001091
5865011631669	FSRS SIGNAL PROCESOR	9	.0032733
5865011678780	PC, ELEC ASSY, HIGH	1	.0
5865011692201	QRC 80-01	3	.0
5865011721469	DRIVER, TWT, MID	8	.000546
5865011795600	RF ASSY, HIGH	1	.000546
5865012056615	FSRS REC'V CONTRLR	8	.0010911
5895011126380	IFF REC'V/XMTR	7	.0016366
5895011420803	FC DATA TRNSFR CART	2	.0
5895011435443	FC DATA FNTRY DISPLA	1	.0
5895012122950	FC RADAR ANTENNA	4	.0
5895012301075	FC DATA ENTRY UNIT	5	.0
5999000037506	RF FAULT MONTR ASSY	6	.0
5999010135206	PC, ELEC ASSY, MID	1	.0
5999010803978	SMS REMOTE INTERFACE	4	.000818
6110010536304	5KVA GENERATOR CNTRL	1	.0
6110011082690	FLT CNTRL POWER SUPP	3	.0
6110011656844	10 KVA GENERATOR CNT	1	.0005455
6110011850452	60 KVA GENERATOR CNT	1	.0
6115010528106	EMER 5 KVA GENERATOR	1	.0
6115012368434	60 KVA GENERATOR	2	.0
6115012465622	10 KVA GENERATOR	1	.000546
6130010517518	ACFT BATTERY CHARGER	5	.0005455
6130011408200	10 KVA FREQ CONVERTR	1	.0
6130011498915	ANTI-COLLISION PWR S	1	.000546
6130012072734	FC DED PWR SUPPLY	1	.000546
6130012099062	10 KVA CNVRTR/REG	2	.0
6130012486604	LAUNCHER PWR SUPPLY	6	.0
6130012577165	LOW VOLT PWR SUPPLY	7	.001637
6140010550435	INU STORAGE BATTERY	6	.0
6140010606855	FLT CNTRL BATTERY	16	.002182
6140011849102	AIRCRAFT BATTERY	24	.0049099
6150003292281	ELECTRICAL CABLES	7	.0
6150011031066	THERMOCOUPLE HARNESS	2	.0
6340001739074	ICE DETECTOR	1	.0
6605010784943	RATE SENSOR UNIT	1	.0
6605012562380	INERTIAL NAV UNIT	5	.0016366
6610002008832	STNBY ATTITUDE IND	1	.0
6610010397817	NORM/LAT ACCELEROMTR	1	.000546
6610010404430	ANGLE-OF-ATTACK IND	1	.0
6610010891018	CENTRAL AIR DATA COM	3	.0
6610010929846	ATTITUTE DIRCTOR IND	2	.0
6610011150131	SERVOED ALTIMETER	3	.000546

NATIONAL STOCK NUMBER	NOMENCALTURE	AUHTORIZED	PROBABILITY OF ISSUE
6610011190832	HORZ SITUATION IND	8	.0021822
6610011480712	AIR DATA ELECT CNTRL	1	.0010911
6610012226439	ANGLE OF ATTACK XMTR	3	.000546
6610012438003	VERTICL VELOCITY IND	1	.0005455
6615007076478	RATE GYRO XMTR	2	.0
6615010427834	FLT CNTRL RATE GYRO	2	.0001818
6615011273160	FLT CONTROL PANEL	2	.0027277
6615011297445	MANUAL TRIM PANEL	1	.0
6615011496398	AIR DATA PNEU SENSOR	1	.0
6615012203851	FLT CONTROL COMPUTER	2	.0016366
6620011670874	FUEL FLOW XMTR	1	.0
6620011805183	INDICATOR, FAN, FTIT	1	.0
6620011805209	TACH INDICATOR	1	.0005455
6680007538932	LOX QTY INDICATOR	4	.0
6680010749369	FUEL QTY CNTRL "C"	2	.0005455
6680011288000	EVENTS HISTORY RECRD	4	.000546
6685004504489	HYD PRESSURE XMTR	4	.0

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Vita

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The purpose of this study was to examine the process of command post exercises and the logistics realism associated with them. The research had several objectives: to identify problems in obtaining realism in exercises; to pose possible solutions to the problems; and to investigate the feasibility of using a computer simulation model to add to logistics realism for response cell play during a command post exercise.

The study identified many perceived problems with the exercise process. Among those problems were: time, time for conducting the exercise, planning the exercise, and participating in the exercise; people, getting the correct participants playing at the proper level and having the best people plan and play the exercise as well as keeping the proper attitude toward the exercise; money, a scarce asset which is becoming even more scarce; and feedback, there is not enough of it for the players or the decision makers.

These findings surfaced through the literature, personal observations during Wintex-Cimex 89, and through interviews of 33 personnel who are familiar with command post exercises. The chief results of those interviews revealed that there is not enough logistics realism in the exercise program, but there is some worthwhile training coming from them.

The operation of the simulation model has not been fully field tested, but the statistical validity of the model is good. The simulation depicts aircraft sortie production from receipt of the air tasking order through post flight actions. After running over 1000 simulated sorties through the model, the values obtained for WRSK use, attrition, and munitions and fuels consumption, mirror what would be expected. As a prototype, the model needs to be tested in an actual command post exercise and compared to the results of other response cells. Once that is accomplished, the model may be further enhanced to include additional logistics concerns.